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ENVIRONMENTAL ASSESSMENT BOARD

VOLUME: 288

DATE: Wednesday, February 6, 1991

BEFORE:

A. KOVEN Chairman

E. MARTEL Member

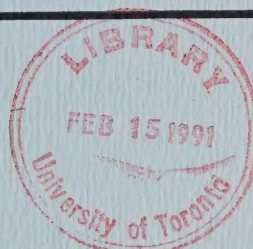
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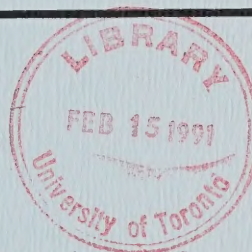
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HEARING ON THE PROPOSAL BY THE MINISTRY OF NATURAL
RESOURCES FOR A CLASS ENVIRONMENTAL ASSESSMENT FOR
TIMBER MANAGEMENT ON CROWN LANDS IN ONTARIO

IN THE MATTER of the Environmental
Assessment Act, R.S.O. 1980, c.140;

- and -

IN THE MATTER of the Class Environmental
Assessment for Timber Management on Crown
Lands in Ontario;

- and -

IN THE MATTER of a Notice by the
Honourable Jim Bradley, Minister of the
Environment, requiring the Environmental
Assessment Board to hold a hearing with
respect to a Class Environmental
Assessment (No. NR-AA-30) of an
undertaking by the Ministry of Natural
Resources for the activity of timber
management in Crown Lands in Ontario.

Hearing held at the offices of the Ontario
Highway Transport Board, Britannica Building,
151 Bloor Street West, 10th Floor, Toronto,
Ontario, on Wednesday, February 6th, 1991,
commencing at 9:20 a.m.

VOLUME 288

BEFORE:

MRS. ANNE KOVEN
MR. ELIE MARTEL

Chairman
Member



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I N D E X O F P R O C E E D I N G S

| <u>Witness:</u> | <u>Page No.</u> |
|--|-----------------|
| <u>ROBERT MULLER,</u> | 51418 |
| <u>PETER MORRISON, Resumed</u> | 51418 |
| Continued Direct Examination by Ms. Swenarchuk | 51418 |
| Cross-Examination by Mr. Hanna | 51520 |

I N D E X O F E X H I B I T S

| <u>Exhibit No.</u> | <u>Description</u> | <u>Page No.</u> |
|--------------------|--|-----------------|
| 1705 | Possible Employment Implications of FFT terms and conditions. | 51423 |

1 ---Upon commencing at 9:20 a.m.

2 MADAM CHAIR: Good morning. Be seated.

3 MS. SWENARCHUK: Good morning, Madam
4 Chair, Mr. Martel. Before Dr. Muller proceeds through
5 the illustrative cost benefit analysis, we have some
6 questions and material to reply to the discussion that
7 began last evening.

8 ROBERT MULLER;
9 PETER MORRISON; Resumed

10 CONTINUED DIRECT EXAMINATION BY MS. SWENARCHUK:

11 Q. And Dr. Muller, my first question is,
12 were you instructed by Forests For Tomorrow with regard
13 to preparing your cost benefit analysis to manipulate
14 or minimize any of the factors in that analysis in
15 order to achieve a preordained result?

16 DR. MULLER: A. Absolutely not.

17 Q. And specifically were you instructed
18 by Forests For Tomorrow to minimize the wood costs used
19 in the analysis?

20 A. Absolutely not.

21 Q. And did you, in conducting the cost
22 benefit analysis and in arriving at the valuation of
23 wood to be utilized, digress from conventional
24 mainstream economic thought with regard to how a cost
25 benefit analysis is conducted?

1 A. To the best of my ability I adopted
2 the standard prescriptions for cost benefit analysis.

3 MS. SWENARCHUK: And I just bring to the
4 Board's attention that Dr. Muller conducted and will
5 present evidence later this morning. He conducted
6 sensitivity tests with regard to the cost benefit
7 analysis with the wood price doubled and he has a
8 certain amount of data also on the effects with the
9 wood price tripled and I will leave him to testify to
10 that later this morning.

11 Q. And further, Dr. Muller, do you think
12 that the implementation of Forests For Tomorrow's
13 proposals will result in shutting down single industry
14 northern towns?

15 DR. MULLER: A. Ms. Swenarchuk, I have
16 given that matter considerable thought over the past
17 evening and morning. I really do not believe that the
18 Forests For Tomorrow proposals, as I understand them,
19 will have the effect of shutting down single industry
20 towns in northern Ontario and I do have some reasons
21 for that. Would you like me to expand on that?

22 Q. Please do.

23 A. I think that the most critical
24 factors driving the effect on employment in single
25 industry towns will be the change in costs, the change

1 in wood costs implied by Forests For Tomorrow's
2 proposals, and the change if any in the constraints
3 that we place on how much wood can be cut in each year.

4 Now, in the case of increased costs, it
5 is my opinion, based on the evidence that I have read
6 and my illustrative cost study, that the percentage
7 increase in the cost of forestry products like
8 newsprint will be imposed, that the percentage increase
9 in costs which will be created by implementing Forests
10 For Tomorrow's proposals will be quite a small
11 percentage.

12 In my illustrative case study, it works
13 out that if we increase the cost of secondary and
14 tertiary roads by over 50 per cent to allow for various
15 factors associated with the modified cut, we increase
16 the cost of wood, the costs of cutting wood by about
17 \$1.60, \$1.70 per cubic metre.

18 If for very, very crude purposes you say
19 you need five cubic metres of wood fibre to produce a
20 ton of product such as newsprint, that would mean the
21 increase in costs per ton of newsprint would be of the
22 order of \$8 per ton. If you say very, very crudely
23 that newsprint is selling for \$500 per ton, then you
24 are talking about an increase of approximately 1.6 per
25 cent.

1 Now, I have no faith in that as a precise
2 number, but what I do have faith in is that the
3 percentage increase in the costs of forestry product
4 production associated with the proposals is very small
5 and is likely to be swamped by factors such as changes
6 in the exchange rate.

7 The second critical factor in determining
8 the effect of Forests For Tomorrow's proposals, I
9 believe, is whether or not they represent a restriction
10 on the amount of wood that will be harvested every
11 year.

12 Now, as I understand it, the Board has
13 received evidence that in many cases, the amount of
14 wood actually being harvested in Ontario is less than
15 the so-called MAD, maximum allowable depletion,
16 considerably less in a number of cases, and I suggest
17 to the Board that the reason for this is that the
18 amount of wood that is being taken is driven by market
19 forces rather than being constrained by the maximum
20 allowable depletion.

21 Now, as I understand it also, one effect
22 of Forests For Tomorrow's terms and conditions might be
23 to restrict the permitted harvest of wood in any
24 particular year. Effectively that means reducing what
25 are now the MADs.

1 Since the MADs are not binding
2 constraints right now in many cases, it is quite
3 possible that you could impose the kinds of terms and
4 conditions that Forests For Tomorrow are suggesting
5 without seriously affecting the total quantity of wood
6 being harvested.

7 Now, I provide you with this opinion in
8 my capacity as an economist thinking of informing you
9 about the things that I think would be relevant in
10 making the decision about whether or not these
11 proposals would have serious impacts in small industry
12 towns and to the best of my ability, my judgment is
13 that there would not be dramatic impact.

14 Q. And Dr. Morrison, do you have
15 comments to add on these subjects?

16 DR. MORRISON: A. I do. I am prepared to
17 set up overheads which I gather will be made available
18 to the Board and parties.

19 MS. SWENARCHUK: Excuse me one moment.
20 So the first overhead then entitled Possible Employment
21 Implications of FFT Terms and Conditions will, I
22 assume, be Exhibit 1705?

23 MADAM CHAIR: Yes.

24 DR. MORRISON: Would you like to make a
25 package of overheads and exhibits? There is a set.

1 MS. SWENARCHUK: Perhaps that is easiest,
2 yes.

3 MADAM CHAIR: And how many overheads are
4 there, Dr. Morrison?

5 DR. MORRISON: There are three.

6 ---EXHIBIT NO. 1705: Package of overheads entitled
7 Possible Employment Implications of FFT
8 Terms and Conditions.

9 MS. SWENARCHUK: Do we have those
10 overheads?

11 MR. COSMAN: These are not in the witness
12 statement. We have never seen them.

13 MS. SWENARCHUK: That's right, they are
14 in response to the Board's questions of yesterday.

15 DR. MORRISON: There are three new
16 overheads and two overheads which I have drawn from the
17 set of overheads I used yesterday, Exhibit 1696.

18 The points I would like to make are as
19 follows: that any employment implications of Forests
20 For Tomorrow's terms and conditions will depend on the
21 cost volume distribution of the inventory faced by the
22 forest industry. Now, I would like to illustrate that
23 with the next overhead.

24 MR. COSMAN: I am sorry, we do not have
25 even a hard copy of these. I wonder if he can just
leave it up so we can make a note of it before you go

1 on to the next thing.

2 DR. MORRISON: Sure. A cost-volume
3 distribution is a process by which you can identify for
4 each cubic metre in the forest inventory the cost
5 associated with harvesting it. And then you can
6 portray that distribution of the volume against the
7 harvesting cost. And the reason that this is useful,
8 can I move on to the next one now? The reason that
9 this is useful is that it allows an identification of
10 what the potential costs are that may be faced by
11 industry in conducting harvesting operations.

12 Now, in this overhead, I have two such
13 cost volume distributions which indicate the amount of
14 volume available at given harvesting costs for the
15 entire inventory. And on the assumption that Forests
16 For Tomorrow's terms and conditions will have an impact
17 on this distribution, we can identify possible impact
18 with the shaded areas in here in Figure A and here in
19 Figure B.

20 In Figure A, the area affected is at the
21 high end of the cost distribution which would imply
22 that if Forests For Tomorrow's terms and conditions
23 have an impact on timber supply available to the
24 industry, inventory available to the industry, that it
25 would be occurring at the high end of the cost scale.

1 The alternative which I have portrayed
2 here is that the terms and conditions would have an
3 impact in terms of eliminating what is the minimum-cost
4 wood or the wood that has the minimum harvesting cost.

5 Now, for a number of reasons, I believe
6 that at least some of the wood that might be removed
7 from potential timber production by Forests For
8 Tomorrow's terms and conditions would be at the high
9 end of the cost scale and the reasons for that is that
10 if you are providing, for example, large areas of
11 undisturbed forest suitable for wildlife habitat of
12 forest interior species, for example, then you are
13 going to be dealing with forest that is not close to
14 mills at present.

15 MR. FREIDIN: Not close to mills, I am
16 sorry?

17 DR. MORRISON: Not close to mills at
18 present. You are going to be dealing with forest which
19 is not accessed at present which means that the costs,
20 transportation costs and road building costs would be
21 higher for that portion of the inventory.

22 In addition, there are reasons for
23 believing that a significant proportion of the
24 available timber production volume that might be
25 removed as a result of Forests For Tomorrow's terms and

1 conditions is at the high end, is that this might be
2 area where forest operations are difficult to carry
3 out, areas such as swampy areas, areas where the
4 terrain is difficult and the harvesting costs
5 associated with operating in such terrain would be
6 higher.

7 Now, there are reasons for supposing that
8 some of the inventory that might be removed as a result
9 of Forests For Tomorrow's terms and conditions would be
10 at the low end and that is that if there are forested
11 areas that are close to urban centres or close to
12 towns, then those might be preferred recreational
13 areas.

14 But probably the most important point
15 from this overhead is that what I have portrayed here
16 in terms of the cost volume distribution is for the
17 inventory as a whole and that is an inventory which, if
18 you assume a rotation age of 100 years, would crudely
19 support a harvest, 100 harvests and the actual harvest,
20 the distribution of harvesting costs observed by the
21 industry, actually the volume removed in a given year
22 will be a very small fraction of this total
23 distribution.

24 And what that suggests is that there is
25 considerable flexibility in terms of the way that the

1 harvest is allocated in space and time to allow for
2 reductions or removals of land from timber production
3 without having a significant impact on a harvest.

4 And that brings me to my next point which
5 is that any possible employment implications of Forests
6 For Tomorrow's terms and conditions is unlikely to
7 depend on changes in supply, the volume for it over the
8 short-term.

9 And the first reason for that is that
10 over the short term, indeed over the next few decades I
11 would argue, we are talking about making a transition
12 to a sustainable yield. This is not a process that is
13 going to happen overnight. And it is a process that,
14 according to Forests For Tomorrow's terms and
15 conditions, specifically number 92, is going to be
16 paying attention to the goals of sustainability of the
17 forest and the goal of community stability.

18 Just to illustrate that first point about
19 the transition to the sustained yield, I am going to
20 turn to an overhead which I presented yesterday which
21 displays the set or the harvesting decision about the
22 cutting schedule and there are three decisions
23 indicated here. You can make a decision about the rate
24 of decline of the harvest associated with the
25 anticipated fall-down, the length of the transition

1 period and the sustained yield level.

2 MR. FREIDIN: Just for the record, the
3 witness is referring to Exhibit 1696, overhead number
4 12.

5 DR. MORRISON: Thank you very much.

6 To my knowledge Forests For Tomorrow has
7 not imposed any terms or conditions which would
8 determine the rate of decline in the harvest associated
9 with the fall-down or the length of the transition
10 period. What that means is that again there is
11 flexibility, especially over the short term to allow
12 for alternate paths down to the sustained yield level
13 or the sustainable level. And that is a flexibility
14 which can accommodate the goal of community stability.

15 The next point I would like to make is
16 that over the long term, those communities can make
17 adjustments and indeed now are making adjustments,
18 adjustments in the face of timber shortages which are
19 the result of present practices, adjustments which
20 reflect the sensitivity of the industry to economic
21 forces beyond their control, notably the shutdowns of
22 sawmills in various towns in Ontario, and they are also
23 making if you like the long-term adjustment which I
24 indicated yesterday associated with technological
25 change which is reducing the amount of employment per

1 cubic metre in the forest industry.

2 The next point I would like to make is
3 that any cost changes are likely to be small. My
4 colleague, Dr. Muller, has already alluded to that.
5 But I would also remind the Board of the forest
6 industry's evidence in Panel 2 where one would expect a
7 fairly strong case to be made for the consequences of
8 withdrawing timber from the land base. And in fact, a
9 relatively small change in delivered wood cost was
10 observed as a result of imposing what they termed
11 inflexible guidelines.

12 The second or the next point that I would
13 like to make is that any cost changes could be offset
14 by elimination of the "oldest first" harvesting rule
15 which the Ministry currently employs which is, in my
16 opinion, an arbitrary rule and without an economic
17 foundation and increased efficiency of forest
18 management.

19 Many of the decisions that I have
20 discussed over the last two days that are made in the
21 course of timber management and forest management could
22 be made more efficiently and presumably with the
23 improved planning associated with that improved
24 decision making, costs could be reduced for the
25 industry.

1 The next point I would like to make is
2 that any effects of cost changes are likely to be
3 undetectable against the background of quite dynamic
4 economic changes in the forest industry's economic
5 circumstances.

6 And to illustrate that, I will just draw
7 on an overhead I used yesterday which is page 24 of
8 Exhibit 1696 which shows the changes in lumber prices
9 over time and I will note that within very short
10 periods of time, on the order of a few months, you can
11 get changes of 30 per cent, changes in lumber prices.

12 MR. FREIDIN: I think that is page 24.

13 DR. MORRISON: Thank you.

14 The last point I would like to make with
15 respect to any employment implications of Forests For
16 Tomorrow's terms and conditions is that it is necessary
17 to consider the distributional effects of any
18 employment changes and that means distribution not only
19 regionally, but among the various employment groups
20 that might be affected by those changes.

21 MR. FREIDIN: Can you go back and show
22 what the last point was, please?

23 DR. MORRISON: Sorry.

24 MR. FREIDIN: What is the bottom thing?

25 MS. SWENARCHUK: Distributional effects

1 of any employment changes must be considered marginal
2 versus discontinuous.

3 MR. FREIDIN: Thank you.

4 DR. MORRISON: And I will be explaining
5 that last point in the next overhead.

6 These are the groups that are likely to
7 be affected as a result of Forests For -- that may be
8 affected as a result of Forests For Tomorrow's terms
9 and conditions.

10 MR. FREIDIN: I am sorry again. For the
11 record we are looking at an overhead entitled
12 Distribution of Possible Employment Effects?

13 DR. MORRISON: That's right, and it is
14 the last one of the three new ones.

15 Okay, for the first three groups of
16 employment --

17 MS. SWENARCHUK: Q. That is logging,
18 sawmilling and pulp and paper?

19 DR. MORRISON: A. Thank you. If there
20 is a change in the amount that can be harvested or if
21 there is a change in cost which translates into a
22 change in the amount harvested, then there may be
23 employment effects in these groups.

24 But I would like to emphasize that those
25 employment effects are likely to be small and that they

1 are going to be evenly distributed. They are not going
2 to be by and large occurring all in one area and will
3 not be occurring just on one town, all be occurring in
4 one town at least for the purposes of this discussion.
5 Which means that the impact or the effect borne by any
6 given town or any given firm is likely to be relatively
7 small and is not likely to lead to a major change in
8 operations.

9 Where we may see a significant effect as
10 my colleague, Dr. Muller, alluded to yesterday, is in
11 the nature of silviculture activity carried out in the
12 province and there what we would likely be losing, we
13 would likely be having a significant employment effect
14 in particular on tree planters operating in the north
15 on a seasonal basis, many of whom, as my colleague
16 pointed out yesterday, do have employment opportunities
17 elsewhere.

18 The last item is the employment effects
19 on the Ministry of Natural Resources and based on the
20 amount of work laid out for them in Forests For
21 Tomorrow's terms and conditions, I would suggest that
22 the MNR's staffing level will increase.

23 MR. FREIDIN: Cost of that?

24 DR. MORRISON: Infinite.

25 MR. COSMAN: Sorry, what was the answer

1 to that?

2 DR. MORRISON: Have I costed that, no.

3 MADAM CHAIR: What would better other
4 industries, Dr. Morrison?

5 DR. MORRISON: Those would be other
6 industries operating in the forest that may increase,
7 that may have an increase in employment, possibly a
8 decrease depending on how they are impacted by timber
9 management activities and depending on how they respond
10 to some of the other Forests For Tomorrow's terms and
11 conditions and I hesitate to draw a conclusion about
12 what direction that might go.

13 Based on some of the concerns as I
14 understand it associated with hunting and fishing and
15 some of the concerns associated with tourism, I would
16 suggest that that might increase; that I would be hard
17 pressed to put a number on that.

18 Now, it may be that if there is a
19 reduction in the amount harvested, that differs from
20 the reduction that we anticipate given the Ministry's
21 current program, or it may be that if costs increase by
22 some amount, that some industries will shut down
23 operations. But that is a possibility that has to be
24 faced.

25 I would like to make two points about

1 that. One is that what we are suggesting if we
2 attribute that shutdown or that closure to Forests For
3 Tomorrow's terms and conditions and associated
4 restrictions is that we are suggesting that it is the
5 last straw that is breaking the camel's back that was
6 responsible for the breakage and not the six bales of
7 hay that were already placed on the camel's back.

8 We would like to remind the Board, for
9 example, there are closures currently being faced in
10 the forestry, that a number of reports have pointed to
11 the difficulty that the sawmilling industry finds
12 itself in at present, especially after the imposition
13 of the 15 per cent softwood export tax, and I would
14 suggest that it is not appropriate to assign
15 responsibility for any closures which might result as a
16 result of imposing Forests For Tomorrow's terms and
17 conditions simply to those terms and conditions.

18 In some cases the industry in some small
19 communities are accidents waiting to happen.

20 Even if there are industries which close
21 down at the same time as Forests For Tomorrow's terms
22 and conditions are imposed, if they are, or shut down
23 at the same time as those are being phased in as many
24 of them -- as I believe Forests For Tomorrow suggests
25 many of them will be, there is the question of

1 addressing what sort of an impact that might have on
2 those communities in which those industries operate.
3 And what kind of employment opportunities exist for
4 people who are employed in those industries.

5 And to get an idea of what that potential
6 impact might be, I drew on the Ministry of Natural
7 Resources evidence from Panel 5 and the industry's
8 evidence for Panel 2 to identify the towns in which the
9 major plants, forestry industry plants occurred in
10 Ontario and specifically to identify whether they
11 occurred in what the Canadian Forestry Service
12 identifies as forest sector dependent communities.

13 For the sawmills, only 8 of the 40 major
14 sawmill operations identified in MNR's Panel 5 evidence
15 occurred in what has been identified as forest sector
16 dependent communities, that represents 20 per cent.

17 Similarly for particle board, it was 20
18 per cent, veneer and plywood, 21 per cent, for
19 waferboard, 25 per cent, and for paper and allied
20 industries, 8 of 33 for 24 per cent.

21 Q. So what this means is that in terms
22 of the possible distributional effects of possible
23 changes in employment that may result from possible
24 changes in wood supply or wood cost, if in fact we get
25 an industry shutdown, it is going to be a relatively

1 small proportion of those industries which are going to
2 lead to a major hardship for the people who are
3 operating in those industries in terms of the ability
4 to find alternative work within their community.

5 So to conclude then, it is possible that
6 there will be some negative employment implications of
7 Forests For Tomorrow's terms and conditions. They are
8 unlikely to be important over the short term because of
9 the flexibility that I have alluded to and because of
10 the commitment on the part of Forests For Tomorrow to
11 sustainability and community stability, and over the
12 long term, adjustments can be fairly readily made. And
13 by over the long term, I am talking 40 or 50 years.

14 Thank you, Madam Chairman and Mr. Martel.

15 MADAM CHAIR: Thank you, Dr. Morrison.

16 MS. SWENARCHUK: Q. I just have one more
17 area of questioning before we proceed to cost benefit
18 analysis and this is to refer again to material
19 presented to the Board by Mr. Benson in part 2 of his
20 witness statement, page 334 and this was in his chapter
21 on the Temagami Crown Unit and I want to put a
22 statement from that chapter to Dr. Muller and Dr.
23 Morrison.

24 And it is with regard to a quotation from
25 the presentation of the Temagami Forest Products

1 Association to the Standing Committee on Resources
2 Development. The important part of their presentation
3 disclaiming the concept of applying sustainable yield
4 to the forest of Temagami was as follows:

5 "To suddenly reduce the volumes by
6 half as indicated for sustainable or
7 normal yield would also reduce the
8 existing mills by half. Which ones will
9 close, who will decide this drastic fate
10 of a community? But with the existing
11 MNR's method there is time for the pine
12 mills to adjust or close down by their
13 own decision. This is happening right
14 now."

15 I would like both of you to comment on
16 the process demonstrated in this quotation relevant to
17 the comments you have made regarding employment
18 implications of Forests For Tomorrow's position; Dr.
19 Muller?

20 DR. MULLER: A. Well, I think this
21 quotation which you have just read dramatically
22 indicates that under current practice, the allowable
23 cut in certain areas is declining and consequently, the
24 volume of wood being taken in certain areas of the
25 province is declining and mills are shutting down.

1 And I think that this is consistent with
2 what people have referred to as the fall-down effect,
3 the fact that the total volume of timber being
4 harvested yearly now is higher than it will have to be
5 under sustained unit management and consequently under
6 current practices, there has to be a continuing decline
7 in the volume of wood being taken.

8 Now, I think this is particularly
9 important to recognize when you ask what are the
10 effects of the terms and conditions proposed by any
11 party and in particular the terms and conditions
12 proposed by Forests For Tomorrow. Because it is only
13 fair to consider what I would call the differential
14 impact. We are going to have reductions in employment
15 because of this fall-down which is predicted by the
16 Ministry of Natural Resources anyway and by Professor
17 Benson under current practice.

18 The only thing that is fair to look at is
19 how much extra reduction in employment might there be
20 by imposing the terms and conditions advocated by a
21 particular party, in particular Forests For Tomorrow.
22 And I would remind you of the crude sketch that we drew
23 last time, I believe it was Exhibit 1703, which
24 indicated that my interpretation of the debate is that
25 Forests For Tomorrow would like to see a small

1 reduction perhaps in the allowable cut now which would
2 allow a somewhat increased allowable cut in the future
3 during the period which the Ministry of Natural
4 Resources envisages a substantial dip.

5 Now, the point I am trying to emphasize
6 is that it is only the difference between the two
7 proposals that we should be examining when we talk
8 about employment effect.

9 Q. Dr. Morrison, did you want to add to
10 his comments?

11 DR. MORRISON: A. No.

12 Q. That is fine, thank you.

13 In that case, Dr. Muller, would you
14 please proceed with your testimony with regard to the
15 illustrative cost benefit analysis?

16 MR. MARTEL: Just before we go on then,
17 because yesterday I raised a matter, I do not know if
18 you had an opportunity to look at it overnight after my
19 colleague raised -- the matter I think has been
20 answered, but we are still looking at - and maybe there
21 are no answers in terms of quantifying what all the
22 other things one must review in determining what type
23 of decision one makes - and that I think you indicated
24 you had looked. Were you able to find anything last
25 night?

1 DR. MULLER: Can you just rephrase for me
2 the specific question you are referring to me?

3 MR. MARTEL: It is hard for me to
4 rephrase my question, it went on for an hour or
5 something like that.

6 But I was concerned about not being able
7 to get a handle on the other factors, economic factors
8 one has to take into consideration when making
9 decisions. We had started to - I think it was after
10 Mrs. Koven raised her question, I indicated the
11 difficulty I was having at least was trying to get a
12 sense of the values that we place on the other
13 non-timber resources and how one ties that in to the
14 decision making if you cannot quantify them in any way
15 at all, you cannot put any value on them at all, how
16 does one take that into consideration and we have not
17 received much, I do not believe, at least not from my
18 satisfaction, during the entire hearing on that area.

19 MS. SWENARCHUK: Q. I think Dr. Morrison
20 has some comments to make on that subject.

21 DR. MORRISON: A. In fact, in response
22 to your question, I prepared two overheads which you
23 will I guess also have to distribute as exhibits.

24 MR. FREIDIN: I am sorry, Madam Chair,
25 was the last set of exhibits given an exhibit number?

1 MADAM CHAIR: Yes, sir.

2 MS. SWENARCHUK: Just include these with
3 1705.

4 MADAM CHAIR: This will be part of 1705?

5 MS. SWENARCHUK: Yes.

6 MADAM CHAIR: And so there are seven
7 overheads all together in 1705?

8 MS. SWENARCHUK: Right.

9 MR. FREIDIN: We are now looking at the
10 overhead which is entitled Valuation of Non-Market
11 Benefits and Costs.

12 MS. SWENARCHUK: Madam Chair, I think
13 there will be five all together. We did not intend to
14 recopy again the two pages from the previous exhibit.

15 MADAM CHAIR: Okay, five overheads.

16 DR. MORRISON: The basic idea behind the
17 valuation of non-marketed benefits and costs is that we
18 are trying to assess the willingness to pay. And the
19 willingness to pay can be assessed through markets and
20 it can be assessed through a number of other means.

21 Willingness to pay can be assessed
22 through the markets. The example that came to mind is
23 for me is that my landlord is trying to sell his house.
24 What he is doing is he is advertising, getting people
25 to come and look at the house, make some guess about

1 how much they think it is worth and is hopefully from
2 his point of view going to sell the house.

3 What he is doing essentially is
4 conducting a survey of the buyers, the potential buyers
5 for his property. He is advertising, he is letting
6 them know what he thinks it is worth and getting their
7 responses or discussing it in any cases or his agent is
8 discussing and there is a negotiation process which
9 goes on in the process of that.

10 The process for valuing non-market
11 benefits and cost is not very different. There is less
12 guidance based on examination of other causes that
13 might be being sold that might be similar as to exactly
14 how much he ought to be suggesting it be sold for. But
15 even if you knew roughly where it was and roughly the
16 size of the house, you could make a reasonable guess,
17 an order of magnitude guess as to what he might be
18 suggesting as its price.

19 For valuation of non-marketed benefits
20 and costs -- there is one other point I wanted to make.
21 That valuation of non-market benefits and costs is
22 important in other areas and I will choose an example
23 that I understand is close to your heart which is the
24 concern for small industry towns.

25 If an industry is faced with a relocation

1 or an industry is faced with a closure and the people
2 in the town are faced with relocation, then they are
3 going to be bearing costs and some of those costs can
4 be marketed as in transportation costs to their new
5 location, but others, other values that they hold,
6 other important things in that community for them,
7 their friendships, the familiarity that they have with
8 their environment, the sense of community spirit which
9 may exist, access to recreational opportunities in the
10 immediate vicinity of the town, all of those are
11 non-marketed benefits, but if we were to compensate
12 them for having to leave that town, we ought to be
13 trying to place a value on that.

14 It is exactly an analogous process trying
15 to place a value on other kinds of non-marketed
16 benefits and other non-marketed costs. And what I will
17 do is briefly go through some of the techniques which
18 Eric Hyman in his article in 1981 which is part of our
19 source book identifies as ways of trying to do that.
20 There are a number of tools which exist, and which have
21 been well developed.

22 The article is now ten years old and he
23 is summarizing research that had occurred up to that
24 point. The research has blossomed since then. There
25 are a number of ways in which you can evaluate the

1 willingness to pay. You can use economic surrogates,
2 economic measures which give you an indication of how
3 much non-market benefits and costs might be by
4 considering related expenditures. How much are people
5 willing to pay for things related to, for example, a
6 particular recreational opportunity.

7 You can also use an approach called the
8 travel cost approach which has been used for such
9 things as evaluating the value that people place on
10 parks or specific locations and what you do is you try
11 and identify how much they have been willing to pay to
12 come to that spot.

13 You can obtain values for the unit day
14 that a particular recreational opportunity or
15 particular benefit is received. You can examine, as
16 might be relevant in some of the resource-dependent
17 communities, you can evaluate the changes in property
18 values. This is also an approach which has been used
19 in many cases throughout North America and other parts
20 of the world to evaluate such things as the impacts of
21 establishing particular undesirable facilities near
22 people's houses such as dumps and landfills, waste
23 disposal sites.

24 You can also examine the wage
25 differentials, the differences in wages which obtain

1 between different areas within a province or within a
2 country to assess the amount that people need to
3 receive to be compensated for living in undesirable
4 circumstances.

5 You can also adopt what are known as
6 supply-side approaches which include an attempt to
7 estimate the cost of replacing a particular feature of
8 the environment or a particular non-marketed benefit
9 and you can also evaluate what kinds of mitigative
10 expenses might be associated with trying to prevent a
11 particular outcome.

12 And again an example of that might be
13 considering how much it would cost to prevent say a
14 decline or a drop in a particular endangered species
15 population.

16 You can consider the costs associated
17 with alternatives, alternative ways of providing the
18 same benefit and use that as an estimate.

19 The third major approach is what has been
20 called hypothetical valuation and it has more recently
21 been labeled with the term "contingent valuation" which
22 as we have already described involves a process of a
23 formal structured process of trying to identify how
24 much people would be willing to pay for a particular
25 benefit and that has been applied successfully and has

1 been used in environmental impact assessment again
2 throughout the world.

3 You can evaluate the kinds of trade-offs
4 that people are willing to make among different
5 benefits or among different costs as a way of trying to
6 get a handle on how much they might be willing to pay.
7 This would mean that you would not necessarily be
8 operating in dollars terms but you could operate in
9 some other currency.

10 Valuation of human lives is relevant in
11 some circumstances. I guess I would suggest that is
12 less relevant for timber management at least insofar as
13 valuing loss of limbs, valuing death or in valuing loss
14 of eyes. Again which is commonly done by insurance
15 companies and through the court system.

16 The last point or the last way in which
17 you can value non-marketed benefits and costs is to ask
18 the question that my colleague alluded to in his
19 example earlier, where you could identify whether
20 people would be willing to pay more than a certain
21 amount to obtain a benefit and then if not, perhaps the
22 project ought not to go ahead. But it does not require
23 you to assign -- to specifically evaluate a benefit but
24 only in comparison to a proposed alternative.

25 MADAM CHAIR: Excuse me, Dr. Morrison, is

1 it your evidence that with respect to everything that
2 could be done in evaluating willingness to pay, what
3 has been done in Ontario is the two studies you
4 referred us to yesterday. Those are the two studies
5 that you know of that have been done in Ontario?

6 DR. MORRISON: Well, in fact, the
7 Importance of Wildlife to Canadians is a national
8 study.

9 MADAM CHAIR: Yes.

10 DR. MORRISON: Those are the only two
11 ones I am aware of.

12 Probably the most important message about
13 the valuation of non-timber benefits with respect to
14 the undertaking being considered is that it is now
15 being used on an operational basis to make forest
16 management decisions in the United States.

17 And to adopt the metaphor which you used
18 yesterday, Mr. Martel, of trying to nail jelly to the
19 wall, I would suggest that the United States Forest
20 Service has in fact nailed the jelly to the wall and it
21 is staying there.

22 And I would like to perhaps direct your
23 attention to the witness statement number 10 when Mr.
24 Zane Smith from the U.S. Forest Service is going to be
25 talking about integrated resource.

1 MS. SWENARCHUK: Q. You're smiling, Dr.
2 Morrison, because you anticipate each one of my
3 questions.

4 DR. MORRISON: A. I hope so.

5 MR. COSMAN: I am sorry, I missed that
6 last.

7 DR. MORRISON: I understand that Mr. Zane
8 Smith from the U.S. Forest Service or formerly of the
9 U.S. Forest Service is going to be addressing the issue
10 of integrated resource management which would include
11 his consideration of non-timber management forestry.

12 MR. FREIDIN: Could you put that slide
13 back up, the last slide.

14 DR. MORRISON: Sure.

15 MR. FREIDIN: Ms. Swenarchuk, will Mr.
16 Smith be speaking to the issue as to whether in fact
17 the valuation of non-timber benefits has in fact been
18 nailed to the wall and it is staying there?

19 MS. SWENARCHUK: I put a similar type of
20 question to them and I'm sure that if we don't, I am
21 sure you will, Mr. Freidin.

22 MR. FREIDIN: Will I be faced with the
23 situation where I should ask all the questions in terms
24 of evaluating, not to ask this panel?

25 MS. SWENARCHUK: No, we do not take that

1 kind of position, Mr. Freidin.

2 MR. FREIDIN: Okay.

3 MS. SWENARCHUK: Q. Thank you very much,
4 Dr. Morrison.

5 One comment, Madam Chair. I believe it
6 is now evident that we will be taking longer to
7 complete the direct examination than we estimated at
8 the beginning and probably going into this afternoon.

9 Would you like to take a break now before
10 he begins his whole new subject area or proceed for the
11 next 15 minutes?

12 MADAM CHAIR: Why don't we take our break
13 now; be back in 20 minutes.

14 ---Recess at 10:20 a.m.

15 ---On resuming at 10:45 a.m.

16 MADAM CHAIR: Please be seated.

17 MS. SWENARCHUK: Sorry to return to a
18 tiresome topic, Madam Chair, but I suppose I must be a
19 little more serious with Mr. Freidin and say that if he
20 has questions with regard to the American literature
21 which need a response from an economist, they should be
22 put to this panel.

23 If he has questions with regard to the
24 utility of those American studies and non-timber values
25 as they are used in the American planning process,

1 those would be appropriate questions for Mr. Smith, but
2 Mr. Smith is not an economist.

3 MR. FREIDIN: Thank you.

4 DR. MULLER: Madam Chair, I would like to
5 turn to Chapter 5 of our witness statement which starts
6 on page 119 and review with you the sample cost benefit
7 analysis which we have prepared. In addition, I am
8 going to be introducing the material by referring you
9 to the Treasury Board benefit cost guidelines which
10 appear in our source book and perhaps you might wish to
11 turn to the benefit cost guide at this point.

12 MADAM CHAIR: That is book number 2, Dr.
13 Muller?

14 DR. MORRISON: Source book number 1 about
15 a quarter of the way through.

16 MADAM CHAIR: Thank you.

17 MS. SWENARCHUK: Q. What is it called,
18 Dr. Morrison?

19 DR. MORRISON: A. Well, it is probably
20 under Canada in terms of the --

21 Q. Yes.

22 DR. MULLER: A. Canada Treasury Board.

23 MADAM CHAIR: 1976?

24 DR. MULLER: 1976. I will be referring
25 to that in a moment.

1 First of all I would like very briefly to
2 make some introductory comments which are highlighted
3 in our witness statement. On page 120 of the witness
4 statement, we make the comment that cost benefit
5 analysis is primarily a method of organizing
6 information about an undertaking so as to guide the
7 selection of the best alternative. And I think it is
8 important to understand what cost benefit analysis and
9 what it is not.

10 Cost benefit analysis is particularly
11 useful, I believe, in helping you organize information
12 in order to make a choice. On page 121, item 5.1.1, we
13 point out that the steps in undertaking a cost benefit
14 analysis include defining the project that you are
15 undertaking, specifying the alternatives that you are
16 going to consider, predicting the impacts on the
17 outputs of each alternative and the inputs of each
18 alternative, and putting a value on these impacts. And
19 I hope that Mr. Freidin will permit me to point out
20 that these are essentially the same stems as are
21 required in the Environmental Assessment Act.

22 On page 123, item 5.1.3, we make the
23 comment that, at least in my personal opinion, there is
24 no one correct way to conduct a cost benefit analysis.
25 A cost benefit analysis is a way of approaching a

1 decision and you can do it in a very simple,
2 straightforward back-of-the-envelope manner or you can
3 do it in a very simple complicated of sophisticated
4 manner.

5 On page 125, at the top of the page, we
6 make the comment that the informational costs of a
7 sophisticated cost benefit analysis may be very high.
8 By informational costs, I simply mean the costs of
9 acquiring all of the information that you need to
10 conduct a detailed cost benefit analysis and the
11 information is expensive to acquire and difficult to
12 get and sometimes not very reliable, and once you try
13 to take it all into account, you sometimes get models
14 of very great complexity. And sometimes people have
15 difficulty in interpreting the results of these models.

16 So that sometimes I think it is possible
17 to do too complicated study. But in the second
18 paragraph of that page, we make the comment that the
19 discipline involved in setting up the simplest of cost
20 benefit analyses is remarkably effective in focusing
21 attention on the key issues of project selection.

22 Certainly that was my experience when I
23 was trying to prepare the sample cost benefit analysis.
24 It lead me, I believe, to a much greater feel for the
25 importance of the various factors that we would have to

1 consider.

2 Now, Madam Chair, I would like to draw
3 your attention to the benefit cost guide prepared by
4 the Treasury Board. It is dated March 1976.

5 Madam Chair and Mr. Martel, I believe
6 that this guide provides an excellent introduction to
7 cost benefit analysis. Although it is now over 14
8 years old, it is still in print and still being sold.
9 I notice that the Treasury Board has roughly increased
10 the price by a factor of 10. It sells for \$15.

11 The information from this benefit cost
12 guideline or guide, I believe, is readily accessible to
13 your average public servant. I assume that your
14 average public servant is an intelligent person who is
15 hard working but has not got a Ph.D. in economics. So
16 the level of this discussion, I believe, is entirely
17 accessible to our public servants who I believe are, as
18 I say, very hard working, intelligent people.

19 I think it might be helpful if I just
20 drew your attention to about six sections of this
21 document. First of all, I would like to draw your
22 attention to Chapter 1 which is labeled "Introduction".
23 It starts on page 3 of the document. And I would
24 simply comment that I find this a very balanced
25 introduction to the topic of cost benefit analysis and

1 it does not claim too much for cost benefit analysis,
2 that is it does not claim that it can solve all the
3 problems of the world. In particular, pages 4 and 5
4 mention some of the limitations of cost benefit
5 analysis, the uses and limitations of cost benefit
6 analysis.

7 I would now draw the Board's attention to
8 Chapter 2. Chapter 2 of this benefit cost guide
9 reviews what they call the conceptual basis of benefit
10 cost analysis. Parenthetically I will remark that I
11 first learned about this subject under the title of
12 cost benefit analysis and other people have first
13 learned of it under the title of benefit cost analysis
14 and I interpret the terms to be synonymous.

15 I draw your attention to the last
16 paragraph on page 8 and the last paragraph stresses
17 that the objective of benefit cost analysis is to
18 measure what total production and consumption
19 opportunities would be with and without these public
20 expenditures. That is the content of the first
21 sentence of the last paragraph.

22 MR. MARTEL: Would we do anything in
23 Canada then?

24 DR. MULLER: Pardon?

25 MR. MARTEL: Would we do anything in

1 Canada then? (Laughter)

2 DR. MULLER: Do you mean -- if this is a
3 serious question, Mr. Martel, the question is whether
4 or not any activities in Canada contribute to
5 production and consumption. I think that I am enough
6 of a Canadian nationalist to believe that there is lots
7 of good consumption and production activities going on
8 in Canada.

9 What I wanted to draw your attention to,
10 Madam Chair and Mr. Martel, is that this objective as
11 stated on page 8 is phrased in terms of economic
12 efficiency but basically it is what I referred to in my
13 introductory comments as making sure that the economic
14 pie is as big as possible.

15 So I would draw your attention to the
16 comments on pages 19 to 24. Page 19, at page 19 begins
17 a section called "Shadow Pricing of Unemployed
18 Resources". And these pages, pages 19 to 24, relate to
19 the shadow pricing of unemployed resources and the use
20 of multipliers. Now, the shadow pricing of unemployed
21 resources refers to the practice which I discussed in
22 my examples last, and I guess it was Monday, when I
23 suggested that when labour was being paid \$10 an hour
24 in one occupation and could only find alternative
25 occupations paying \$5 an hour. I said that doing a

1 social cost benefit analysis would put a price on the
2 labour of \$5 an hour. That is called shadow pricing.
3 So the comments in this section are relevant to my
4 discussion of dealing with unemployment issues.

5 These pages, Madam Chair and Mr. Martel,
6 warn against uncritically assuming that resources are
7 unimportant and they warn against the use of secondary
8 benefits and multipliers and we have been through this
9 discussion before, I just would like to draw your
10 attention to this discussion but you may wish to
11 consult and you may wish at a later date to ask me
12 about.

13 I would like you to note the statement on
14 page 31. The second paragraph of page 31, this
15 paragraph states:

16 "That the fundamental criterion for
17 investment in circumstances of choice is
18 unambiguous. The investments should be
19 chosen which maximize net present value."

20 And I interpret this to be the same
21 concept as the maximization of the net present value of
22 social benefits which is the criterion which we have
23 been advocating in our discussion.

24 I would like to draw your attention to
25 the discussion of non-efficiency effects following page

1 32. At the bottom of the page 32 it says:

2 "The federal government may have goals
3 in undertaking public projects other than
4 that of improving the efficiency of the
5 economy."

6 And moving onwards to page 39, there is a
7 discussion on about how to deal with questions
8 associated with the distribution of income, questions
9 which I referred to in my introductory comments as
10 determining what is the size of the slice of the pie
11 that each person gets.

12 There are very useful comments in these
13 sections. They lead to a recommendation on pages 43,
14 on page 43, that separate presentation of the
15 distributional effects of a project should be presented
16 separately.

17 Now, I must confess to the Board that in
18 drawing up our sample cost benefit analysis, I did not
19 prepare a table showing the distribution of costs and
20 benefits. I plead only lack of time.

21 Finally, I would draw your attention to
22 the appendix on pages 75 and 76. This appendix refers
23 to an inventory of common errors in benefit cost
24 studies. Particularly relevant are errors such as the
25 second one, counting appreciated value of land relative

1 to the general price level as a benefit.

2 This has to do with questions of property
3 values. And I will content myself simply by suggesting
4 that losses in property values such as the loss in the
5 value of a house need to be interpreted very carefully
6 in the context of benefit cost analysis.

7 Basically the problem is to avoid double
8 counting, that is, you can count the loss in wages that
9 a person is expected to obtain in a particular
10 community or you can count the value of his house so to
11 speak. The point is that the value of his house in
12 some sense represents the capitalized value of all the
13 benefits he expects to get from living in his house
14 while he resides in the community.

15 So if the benefits from residing in the
16 community fall, for example, if employment
17 opportunities fall, then you can say that a person has
18 suffered an annual loss as measured by his reduction in
19 income or you can say that he has taken a capital loss
20 which might be measured by the loss in his property
21 values but you shouldn't do both at the same time.

22 MR. MARTEL: But could I ask a question.

23 DR. MULLER: Yes.

24 MR. MARTEL: Has he not lost both? I
25 mean, you lose your job and you have no income and you

1 are forced to relocate and you cannot sell your house.

2 How is that a double entry?

3 DR. MULLER: Well, I believe that what
4 you should be looking at is the issue of -- he moves to
5 a different community, he has lost some income there
6 but he has also lost the benefits of living in the
7 community that he was in to begin with. And they can
8 be, in some sense, measured by what people are willing
9 to pay to achieve them.

10 One way of getting those benefits is to
11 buy a house in the community so that the value of the
12 house measures the capitalized future value of the
13 benefits you see from living in the community. You do
14 not like that?

15 MR. MARTEL: Well, let us take an example
16 of a miner who loses his house on three different
17 occasions because he worked in three different mines
18 and all three mines closed underneath him in a ten-year
19 period. This is factual. He not only had to relocate
20 halfway across Canada, he lost his job and he lost his
21 house in both communities, in three different
22 communities, his investment in his house each time was
23 lost and his job was lost.

24 Now, I mean, one can argue, I guess, some
25 economics jargon, but to the guy who has lost the job

1 and who has lost the house three times, I do not care
2 what kind of figures or jargon you put around it, he
3 has taken a hell of a beating.

4 DR. MULLER: That is absolutely true.
5 Mr. Martel, I do not want to minimize the importance of
6 the examples that you draw.

7 I will draw your attention to item 76,
8 the item at the bottom of page 76 which refers to
9 including transfer payments in benefits or costs. Now,
10 dealing with property values really is tricky but when
11 a guy takes a beating on a house so to speak, he loses
12 money, but the guy who buys the house gets money in the
13 sense that he gets a house which is providing certain
14 services and he gets it at a bargain. So in some sense
15 what is happening is that --

16 MR. MARTEL: Sounds like a piranha.

17 DR. MULLER: Well, you know, it is a
18 cruel world out there. People make good bargains and
19 people make bad bargains and to some extent, what that
20 represents is a transfer of spending power from one
21 individual to another individual. And these are called
22 in economic jargon, transfer payments, and the point
23 being made in the cost benefit guide is that transfer
24 payments neither increase nor decrease the total value
25 of consumption opportunities available in the economy.

1 And consequently if you are interested in
2 the size of the pie, you shouldn't be counting them.
3 Now, the cost benefit guide also makes the point that
4 if you are interested in the distribution of income,
5 that is if you are interested in who is getting hurt
6 and who is benefitting, then it is legitimate to
7 consider these points.

8 And so that is why I draw your attention
9 to this discussion in the guide. They, at several
10 points, specify that items of the kinds that are most
11 concerning you should be treated as distributional
12 effects and they should not be treated as allocative
13 effects, that is effects which change the overall size
14 of the economic pie.

15 MR. MARTEL: I have one more question
16 then. When you are forced out, even the economic pie
17 does not get any bigger because the value of the house
18 in those communities is so greatly diminished that it
19 would not -- would it increase the size of the economic
20 pie?

21 In other words, if you were selling a
22 house in Toronto, you get a value based on market
23 factors and so on. But when you lose and buy a house,
24 you lose the house and the buyer in one of those small
25 one-industry towns, whoever might buy it, probably

1 buying it for cottage purposes, the value is diminished
2 so greatly on the value of that property, all the other
3 market factors are gone, it is just that here somebody
4 can buy a place because Joe is losing it because he is
5 locating and I can pick it up for \$2,000 instead of
6 what was the cost maybe to build it, of \$50,000.

7 Does that in any way alter the economic
8 pie theory that somebody's loss is someone else's gain,
9 but the true value or the original value before let us
10 say in a one-industry town, is gone, there is no real
11 market value left. I mean is that taken into
12 consideration I guess when doing an analysis?

13 DR. MULLER: Well, the short answer is
14 that cost benefit analysts have spent a lot of time and
15 consumed a lot of ink in trying to clarify the
16 appropriate way of treating changes in property values.
17 And it is my understanding of that literature that you
18 have to be careful in doing so and the summary
19 statement is you have to be careful in doing so because
20 the property values represent the capitalized value to
21 a person of living in a particular place.

22 Now, we can dig into the reasons behind
23 that at greater length if you want, but that is the
24 essence of my answer.

25 May I just point out a few more warnings

1 in the guide. There is a warning at the top of page 76
2 against the routine application of shadow prices that
3 are below market prices of resources on the grounds of
4 unemployment.

5 There is a warning against the routine
6 assessment of the multiplier effect of income and
7 spending generated by a project on unemployed
8 resources.

9 And there is a warning against claiming
10 benefits for a project that provides above-average job
11 opportunities as manifested by an above-average wage
12 rate.

13 Now, I draw these to the Board's
14 attention because these are warnings which are given in
15 an accepted manual of cost benefit guidelines. I
16 subscribe to the reasoning behind these warnings. In
17 the guide there are some discussions about when it is
18 appropriate to deviate from the routine and when it is
19 not appropriate to deviate from the routine.

20 But I just wanted to emphasize to the
21 Board that the position that I have been trying to
22 recount in the statement that I have been making is not
23 particularly idiosyncratic to me, it is consistent
24 with, I think, a reasonable interpretation of other
25 documents.

1 Now, at this point perhaps I could use
2 the overhead.

3 MS. SWENARCHUK: Q. You will now also be
4 using overheads other than available I believe in
5 Exhibits 1695 B and C, is that correct?

6 DR. MULLER: A. That's correct.
7 Primarily I will be using 1695 C. On one or two
8 occasions, I will refer to 1695 B.

9 Q. I just have one comment before you
10 proceed, Dr. Muller. I wonder if you could comment on
11 one more error in the inventory and that is calculating
12 costs out of government grants and that is found at
13 page 74 of the report.

14 A. Certainly, Ms. Swenarchuk. The error
15 is headed on page 74 calculating costs net of
16 government grants. And the author of the guide is
17 making a point which is very similar, I believe, to the
18 point I make when I considered my agricultural examples
19 in which the government was subsidizing the purchase of
20 fertilizer.

21 I was emphasizing at that point that a
22 social decision should be made on the costs of all the
23 inputs regardless of who paid for them, just as it
24 should be based on the benefits of all the outputs
25 regardless of who gets them. And I believe that this

1 warning against calculating costs net of government
2 grants is another way of expressing the ideas that I
3 was trying to communicate then.

4 Q. Thank you.

5 A. Now, Madam Chair and Mr. Martel, I
6 have tried to organize my presentation roughly along
7 the lines recommended by the Treasury Board in these
8 guidelines. The problem at hand is the choice of a
9 harvest and silvicultural system for a hypothetical
10 forest management unit.

11 Now, I might emphasize that the purpose
12 of this demonstration is to give a flavour for the
13 kinds of things that you might address in a cost
14 benefit analysis and also to use, for the purposes of
15 illustration, numbers which are realistic so that they
16 give us some flavour of the kinds of results we might
17 see in actually applying this kind of cost benefit
18 analysis.

19 I emphasize that in my opinion the
20 results would differ in different forest management
21 units, that is why I recommend that this kind of
22 process be done systematically at the forest management
23 unit level. So in any case, the problem as I see it is
24 to choose a harvest and silvicultural system for a
25 hypothetical forest management unit.

1 Now, to do that you should have an
2 objective. And I interpret the policy objective, a
3 cost benefit analyst has to look at the policy
4 objective which is given and I take as the objective of
5 this analysis the choice of a harvest and silvicultural
6 system which will better the people of Ontario by
7 wisely managing the forest environment.

8 And for the purposes of cost benefit
9 analysis, I am going to interpret this objective as
10 requiring that we attempt to maximize the social net
11 present value of forest services.

12 Now, social net present value is my term.
13 I view it as having the same content as the requirement
14 to maximize net public benefit in the Forest Management
15 Act of the United States. The concept can be named
16 various names but they are all essentially maximizing
17 the net present value of the social benefits that we
18 get from the forest services.

19 Now, Madam Chair and Mr. Martel, in
20 choosing, it is recommended in doing a cost benefit
21 analysis that you try to be as explicit as possible
22 about the alternatives that you consider. And for the
23 purpose of this presentation, I have considered four
24 basic alternatives and two variants on one of those
25 alternatives.

1 The first alternative which I have
2 considered is to use the forest management unit for
3 non-timber uses only. I believe it would be fair to
4 call that the null alternative.

5 The second alternative which I have
6 called B involves my understanding of Professor
7 Benson's recommendations concerning modified cutting
8 and enhanced natural regeneration of the forest.

9 And in particular I have considered, on
10 Professor Benson's advice, Alternatives B1 and B2.
11 Alternative B1 is a thorough-going 3 coupe modified
12 cutting system in which you make three passes to cut
13 over the entire forest area.

14 And as I will mention in a moment, the
15 leave period, the interval between each pass turns out
16 to be about 10 or 11 years so it is a 3 coupe system
17 with a ten-year leave period.

18 The second modification or second variant
19 is a 2 coupe system which I have included again on the
20 suggestion of Professor Benson.

21 The third alternative which I have
22 considered is what I interpret to be current practice.
23 So it is meant to represent large-area clearcutting
24 with intensive artificial regeneration.

25 And the fourth alternative which I have

1 considered is the alternative of cutting down the area
2 quickly using large area clearcutting methods and then
3 just leaving it to regenerate by itself. So
4 Alternative D is large area clearcutting followed by
5 natural regeneration.

6 Now, looking at an overhead labeled
7 constraints, it is the third overhead in package 1696
8 C, in Exhibit 1696 C, page 3. Cost benefit analysts
9 are advised according to the Treasury Board, to
10 consider constraints on alternatives. That is some of
11 the alternatives you list in the first section of your
12 report might be thrown out to begin with because they
13 violate some public policy constraint which is imposed
14 on the analysis.

15 Now, the main constraint that I have
16 tried to impose in this analysis is the constraint of
17 sustained yield, what I have referred to as sustained
18 yield. Now, I understand that the distinction between
19 sustained yield and sustainable yield has been a matter
20 of discussion before this Board.

21 So please allow me to say that for the
22 purposes of this case study, I have interpreted
23 sustained yield as meaning that we have to have an even
24 flow of wood cut throughout the first harvest, an even
25 flow of wood throughout the first rotation and also

1 that we harvest perpetually, that is after the first
2 forest has been cut over, a new harvest is to take its
3 place, a new forest to take its place and it is to be
4 harvested in its turn.

5 Now, Alternative D violates the
6 constraint of sustained yield in the following sense.
7 It involves a high rate of harvest during the first
8 rotation followed by a much lower rate of harvest
9 because I assume for purposes of illustration, that the
10 period for regeneration is very long under Alternative
11 D, namely 200 years. So that the volume of wood that
12 would be taken under Alternative D would be sustained
13 for 80 years and then it would fall to essentially
14 nothing until the next regeneration was available.

15 Now, I am going to turn to page 4 of the
16 overheads. I am now trying to briefly explain a bit
17 more about the assumptions which have been made in
18 preparing this illustrative cost benefit study. I
19 remind you of course that I have had to simplify, treat
20 all of the forest management unit as being managed
21 under one regime whereas in real life there might
22 easily be different spots within the forest management
23 unit that were more appropriate for different uses.

24 For the purposes of analysis, I have
25 assumed an area of 490,000 hectares, roughly 70

1 kilometres by 70 kilometres. I have assumed that the
2 area is stocked with mature softwoods, mature conifers.
3 I have assumed that the stocking is 130 cubic metres
4 per hectare, by which I mean that I assume you can get
5 130 cubic metres of usable wood out per hectare of the
6 forest management unit.

7 I have assumed that the mill is 100
8 kilometres away from the forest management unit so we
9 have to do some -- make some kind of assumption about
10 how far you have to take this timber to get it to the
11 mill.

12 Most of what I have to say is independent
13 of these particular assumptions because most of what I
14 have to say starts from the value of the wood on the
15 stump, but for the purpose of calculating that in my
16 illustrative cost benefit analysis, I think it is
17 useful to be explicit about such things as
18 transportation costs.

19 Now, I assume that this forest management
20 unit is being used for several purposes. I assume that
21 there are what are sometimes called consumptive uses of
22 the forest environment. It is being used to produce
23 timber and it is being used by people who want to hunt
24 or fish, that is consumptive in the sense that it uses
25 wildlife.

1 And for illustrative purposes, I have
2 also assumed that there are some recreational uses
3 which I have labeled non-consumptive involving road
4 access and wilderness. Now, again because this was an
5 illustrative example, I have not gone too far down the
6 road of measuring non-timber uses.

7 I had in mind a picture in which there
8 were two types of recreational users, the kind that
9 wants to go in by road and paddle around, camp, and the
10 kind that gets a lot of value out of the wilderness
11 experience.

12 Because some people, including myself,
13 feel that the pleasure you get out of canoeing in a
14 wilderness area is significantly greater than the
15 pleasure you get out of canoeing an area in which there
16 are roads and motorboats everywhere.

17 The details of the assumptions are given
18 on Table 1 of the witness statement and further
19 information about where I got the numbers is given in
20 Table 11, I believe it is, of the witness statement.

21 I am now going to turn to page 5 of the
22 overheads in Exhibit 1696 C and go over very quickly --

23 MS. SWENARCHUK: Q. Excuse me, is that
24 not 1695 C?

25 MADAM CHAIR: Yes, that's right. It is

1 not 1696, it is 1695.

2 DR. MULLER: I am sorry, I labeled my
3 copy incorrectly.

4 Exhibit 1695 C. Again, it is incumbent
5 on a person who is doing a cost benefit analysis to try
6 to be as explicit as possible about the assumptions
7 that he or she is making. And in this particular case,
8 I had to make some base case assumptions, some
9 assumptions which I was going to work from.

10 I assumed for the purpose of the base
11 case that the delivered price of wood at a mill was \$25
12 per cubic metre. I got that by phoning up Canadian
13 Forest Products in Thunder Bay and asking them how much
14 they were paying for wood.

15 We have already heard questions from you,
16 Madam Chair and Mr. Martel, about whether or not that
17 undervalues wood in an important sense, and I want at
18 this point to say that most of my discussion, most of
19 my graphs will be for a price of wood of \$50 per cubic
20 metre which is double this price. And there is even a
21 sensitivity analysis of what would happen if the price
22 of wood was \$75 per cubic metre.

23 So I want to stress that while the values
24 reported in the witness statement are a first cut base
25 case for which I make no apology, I am quite prepared

1 to believe that in many cases the value of wood is more
2 than indicated and I will conduct most of my analysis
3 as I said for a delivery price of \$50.

4 I assumed also that there was a \$20,000
5 per kilometre charge for building secondary roads and a
6 \$8,467 per kilometre cost of building tertiary roads.
7 I assumed that the primary roads were already in place,
8 that is I have not counted the cost of building primary
9 roads in this analysis.

10 I have assumed the logging costs of
11 \$18.50 per cubic metre. I have assumed a haulage cost
12 of .07 per cubic metre per kilometre which works out to
13 be \$7 per cubic metre for the 100 kilometres that we
14 take the wood from the forest management unit to the
15 mill.

16 I have assumed on the basis, primarily of
17 evidence provided by Professor Benson and also evidence
18 from current forest management agreements, that the
19 planting cost when you regenerate the forest
20 artificially is \$500 per hectare and that it costs \$50
21 per hectare to spray, to tend the forest.

22 I have assumed a real interest rate of
23 five per cent.

24 I have assumed that all the prices in our
25 analysis rise at exactly the same rate as the general

1 price level, so that if inflation is at 10 per cent a
2 year, I am assuming that the price of everything in our
3 example is going up at 10 per cent a year and I have
4 cancelled all of those out by applying a real interest
5 rate of five per cent instead of a market interest rate
6 of 12 or 13 per cent which is the kind of market
7 interest rate that we see now.

8 I have also assumed that the delivered
9 price of wood from this forest management unit does not
10 change when you increase or decrease the volume of wood
11 each year being taken away from it. That is, the price
12 the mill is willing to pay for this wood does not
13 change if we make a small change in the quantity which
14 we extract.

15 Most of these assumptions are made for
16 the purposes of simplicity and establishing a first
17 cut. They are almost all susceptible of modification
18 if you wished.

19 Let me briefly go over some of the
20 special assumptions that I made about each alternative.
21 I am now looking at page 6 of Exhibit 1695 C and the
22 special assumptions that we make in the non-timber use
23 case are first of all that there is no harvest system
24 because there is no timber use.

25 There is no silvicultural system because

1 there is no artificial regeneration.

2 There is some recreational use. And I
3 must say that for purposes of analysis, I had to use
4 numbers for which do not have a firm basis in the
5 experience of any particular forest management unit.

6 I think it is obviously that some forest
7 management units are going to incorporate territory in
8 which recreational use is going to be very valuable and
9 other forest management units are going to incorporate
10 territory where recreational use is not nearly so
11 valuable.

12 I have assumed for the purposes of
13 illustration that there are currently 1,000
14 hunting/fishing days in the forest and that each hunter
15 or fisher is willing to pay \$25 for that hunting or
16 fishing experience. That is to say even if you charge
17 that hunter or fisherman an admission fee of \$25 a day,
18 he or she would continue to hunt or fish.

19 Similarly, I have assumed that there are
20 500 visitor days of road access recreation and 1,000
21 visitor days of wilderness recreational consumption and
22 you will note here that although it turns out that this
23 is not important in the final numbers, I have made the
24 assumption that wilderness use has a much higher value
25 than road access use to try to capture the idea that is

1 often promoted by recreational groups that wilderness
2 recreation has a high value that must be preserved.

3 I am now turning to page 7 of the
4 overheads where I briefly review the assumptions made
5 in the case of the modified harvest alternatives. For
6 the purpose of this study, we assumed or I assumed
7 because I drafted this, a rotation period of 100 years
8 for the modified harvest system. This is on the advice
9 of Professor Benson and it is to incorporate the fact
10 natural regeneration takes a longer time than
11 artificial regeneration. The regeneration lag is
12 longer. So I am assuming public policy tells us that
13 our current harvest has to be spread over 100 years
14 because it is going to take 100 years to regenerate the
15 next crop.

16 I am assuming in Alternative B1 that
17 there are 3 coupes and in alternative 2 that there are
18 2 coupes, that is three passes through the forest and
19 two passes through the forest. I am assuming a
20 ten-year leave period between successive coupes.

21 Now, my reading of the literature that
22 has been presented to the Board is that one of the
23 primary concerns in modified cutting techniques is the
24 possibility that you will have to accelerate the
25 construction of your roads because when you start to

1 cut, you need effectively three times as much road as
2 you did with large area clearcutting.

3 So for reasons which I discuss in the
4 witness statement, I have assumed that if you use a 3
5 coupe system, your road costs rise by 56 per cent so I
6 have been trying to make what I consider to be quite a
7 strong assumption about the increase in road costs.
8 And I refer to that as a road cost premium and the real
9 problem here is that you are accelerating the
10 construction of the roads.

11 For the silvicultural system we are
12 assuming enhanced natural regeneration, it is enhanced
13 because of the cutting techniques. And it looks as if
14 I cannot spell regeneration very well there, I
15 apologize.

16 I assume that no planting is undertaken,
17 no spraying is undertaken, that the second rotation
18 lasts 100 years and that the yield on the second
19 rotation is the same as the natural yield which is 130
20 cubic metres per hectare.

21 I tried to make sensible illustrative
22 assumptions about predicted changes in recreational
23 pattern. Because we are going to have more roads, I
24 predict more use of every kind. Basically I have
25 doubled the hunting and fishing access, doubled the

1 non-consumptive road access and also doubled the number
2 of people who go in there looking for wilderness
3 experience.

4 But the people who were looking for a
5 wilderness experience do not get nearly as good a
6 wilderness experience as they used to because there is
7 roads because I have got the willingness to pay
8 noticeably less than I had before.

9 MADAM CHAIR: Dr. Muller?

10 DR. MULLER: Yes.

11 MADAM CHAIR: I do not understand quite
12 why the road premium is more costly for the 3 coupe
13 system. Would it not just be a matter of road
14 maintenance for the longer leave period for the third
15 cut? You are not talking about a larger network of
16 roads because you are talking about the same area.

17 DR. MULLER: Yes. Madam Chair, I had
18 some difficulty with this because I am not a forest
19 economist whose specialty is in harvesting techniques.

20 What I did do was I assumed that in the
21 first year of harvesting, instead of having to build
22 one kilometre of road, you had to build three because
23 you have to access three times as much territory in the
24 first year. And you have to do that for the first ten
25 years.

1 And by that time, you have built in the
2 first ten years of your process, you have built three
3 times as much road as you would have done under
4 Alternative C. Because with this big, long ten-year
5 leave period, I have got three times as much road being
6 produced and I cannot go back to making my second coupe
7 until eleven years later.

8 So by the end of ten years, I have got a
9 road network which is three times bigger than I would
10 have had. Then I do not have to build -- I assume I do
11 not have to build roads for the next 20 years. So by
12 the end of 30 years, I have built the same number of
13 roads.

14 The big problem is that I built them in
15 the first ten years of the program rather than
16 spreading them out evenly. And because of the magic of
17 net present value calculations, that is an
18 extraordinarily expensive thing to do. The net present
19 value or the present value of the cost of a road built
20 30 years from now is much less than the present value
21 of a road built ten years from now.

22 So by squeezing all of the building,
23 accelerating the building of the roads into the first
24 ten years of each 30-year period, I am forced to
25 ascribe a much higher present value to the costs and

1 that is why the 3 coupe system looks so expensive.

2 MR. MARTEL: Do you include the
3 maintenance costs in there or just construction or is
4 that possible?

5 DR. MULLER: I am sure it is possible. I
6 didn't feel that I had the expertise to model, sorry
7 for the jargon, but I didn't feel I had the expertise
8 to go to great lengths in this illustration to
9 incorporate maintenance costs so I did not.

10 What I have done is tried to illustrate
11 the way in which you can incorporate these matters and
12 make what I feel is quite a conservative assumption,
13 that is to say I think I have penalized the 3 coupe
14 system quite handsomely with respect to the others.

15 Are there any other questions that you
16 would like me to address with respect to this overhead?

17 MADAM CHAIR: No.

18 DR. MULLER: I am now going to move to
19 the eighth page of Exhibit 1695 C.

20 MR. FREIDIN: I am just wondering just so
21 we do not have to wait to ask in cross-examination
22 whether you could just explain, it says management of
23 \$100,000 at the bottom. You had the same thing I think
24 at the bottom of the previous exhibit.

25 DR. MULLER: Certainly. My assumption is

1 that it is only fair that --

2 MS. SWENARCHUK: You owe me one for this.

3 MR. FREIDIN: I owe you one, Ms.

4 Swenarchuk.

5 DR. MULLER: It is only fair that if you
6 are going to count benefits of recreation, you ought to
7 have some entry for the costs of administering that
8 recreation. Now, I do not know what those costs are
9 going to be.

10 I said to myself, suppose you had four
11 seasonal employees working at -- the equivalent of four
12 full-time employees working at \$25,000 a year, that
13 would be \$100,000 to manage the recreational use. I do
14 not claim anything for this figure except that it is a
15 place marker. It is a marker to put, to remind you
16 that something is needed to offset the recreational
17 benefits. You have to ask yourself about the real
18 costs of providing those benefits.

19 I do not think that the benefits we are
20 asking, we are talking about require very much
21 management and that is why I have got a fairly low
22 cost.

23 Incidentally, "dollars per A" stands for
24 dollars per year, dollars per annum.

25 I am sorry, did I discuss the C?

1 MR. MARTEL: No.

2 DR. MULLER: I am going back to page 8 of
3 the overheads. This is the interpretation of current
4 practice adopted for purposes of my illustrative case
5 study. A very important idea here turns out that the
6 harvest system assumes a large area of clearcut with a
7 rotation period of 80 years. This is 20 years less
8 than the 100 years assumed for the modified clearcut.

9 The reason for that is I assume that
10 public policy is going to tell me that if it takes 80
11 years to grow a new forest, then you better spread your
12 cutting of the current forest over 80 years so that you
13 will finish cutting your first forest when the second
14 forest is available for cutting.

15 And because it is claimed that current
16 practice large scale clearcutting and artificial
17 regeneration will lead to quick establishment and rapid
18 rotation periods, I have assumed that the artificial --
19 the large area clearcut system allows us to cut through
20 the current forest in 80 years rather than 100. That
21 turns out to be really critical. It is what I call the
22 allowable cut effect. And it has to do -- and what
23 happens is that it is this assumption about public
24 policy which creates an important advantage for the
25 artificial regeneration system.

1 Now, I assume that we plant at \$500 per
2 hectare as soon as we cut down. I assume that we
3 spray, it looks to me as if the overhead I am
4 projecting is not the same as the overhead which is on
5 page 8 of the exhibit.

6 And the difference is that page 8 of the
7 exhibit which is the one that I want to use says spray
8 in 5 years and 15 years.

9 MR. MARTEL: That is what we have.

10 DR. MULLER: So it is my actual overhead
11 that I am projecting which did not have the 15 years on
12 it. So in fact, I did assume a spray in 5 years and a
13 spray in 15 years.

14 I assumed that it was possible to create
15 a second forest in 80 years and the second rotation
16 would be 80 years. And I assumed that because of the
17 benefits of intensive forest management, the yield on
18 the managed forest would be 50 per cent higher than the
19 natural unit. So that is where I get the 195. I am
20 just taking that as 50 per cent higher than the natural
21 yield of 130. I am doing this on the advice of
22 Professor Benson which I sought in forming.

23 Of course, this will be challenged and I
24 gather that it will be challenged in both directions.
25 My interest as an economist is showing you in which,

1 how you would incorporate it.

2 As far as recreation is concerned, I
3 assumed that the same number of days are consumed but
4 that people do not like recreating, excuse the horrible
5 word, people do not like recreational activities which
6 take place in clearcut areas as much as they like
7 recreational activities that take place in the modified
8 cut areas and consequently, I have reduced slightly the
9 willingness to pay for each day of recreation. I have
10 included management costs as well.

11 I would like to point out that I have not
12 really addressed the issue of watershed prevention,
13 watershed protection or biological diversity or any of
14 these other values about which you have heard
15 testimony. Again, my theme as I mentioned at the very
16 beginning of my testimony is that quite often you can
17 make a decision on the basis of easily measured costs
18 and benefits without worrying too much about placing an
19 explicit value on the more difficult, the benefits
20 which are more difficult to measure.

21 Madam Chair and Mr. Martel, the slide,
22 the overhead which is number 9 in your handouts refers
23 to the assumptions which I made for large area
24 clearcutting with natural regeneration. I remind you
25 that this was the alternative which I interpret as

1 being ruled out for reasons of public policy, that is I
2 interpret public policy as saying we have to have
3 sustained yield. But I think it is an interesting
4 alternative to examine and we will see why in a moment.

5 I assume that we cut the forest down,
6 that we have no artificial regeneration, that it takes
7 200 years to grow back the forest to the point where
8 you can use it again. That was meant to mean -- that
9 was meant simply to refer to the idea that it takes a
10 very long time and I assume that the yield of the
11 subsequent forest is only 80 per cent of the original
12 standing forest. So it is only 104 metres cubed per
13 hectare.

14 All of these assumptions are designed to
15 penalize the future harvest of this method. I assume
16 that there are recreational values and the recreational
17 values are the same as they would be for the large area
18 clearcutting or at least they are on the first cut
19 because the first harvest under Alternative D is
20 exactly the same as the first harvest under Alternative
21 C.

22 Madam Chair and Mr. Martel, are there any
23 questions you would like to raise at this point about
24 the assumptions that I have made or shall I go on and
25 talk about the results which I have obtained?

1 MADAM CHAIR: Go ahead with the results,
2 Dr. Muller.

3 DR. MULLER: Now, I apologize for the
4 quality of this, I know it is actually not so...

5 I am now looking at an overhead which is
6 page 10 of Exhibit 1695 C and I might apologize to the
7 Board. I would like to draw your attention to the
8 vertical axis which is labeled "Net Present Value,
9 Thousands". That is a device, that is a result of the
10 computer program that I used and did not have a chance
11 to correct. That should read millions of dollars, in
12 other words, this is thousands of thousands of dollars.
13 It is millions of dollars. So the vertical axis is net
14 present value measured in millions of dollars.

15 DR. MORRISON: Excuse me, Dr. Muller, is
16 that the same for the other?

17 DR. MULLER: That is the same for page 11
18 and it is the same for page 12 and page 13 I managed to
19 correct.

20 Now, it is not surprising that in the --
21 although it took me by surprise when I did the
22 calculation, it shouldn't have been surprising when I
23 did the calculation to find that the net present value
24 of Alternatives B, B1, B2, C and D were all negative
25 under my base case assumptions.

1 My base case assumptions you will recall
2 included a price at the mill of \$25 per cubic metre of
3 wood. I had assumed already that it cost \$18.50 to cut
4 the wood and I had assumed that it cost \$7 to bring the
5 wood to market because the forest management unit was
6 100 kilometres away from the mill. And so
7 consequently, I could have simply looked at the \$25 of
8 value of the wood at the mill and subtracted \$25.50 of
9 cost of getting the wood to the mill and it would have
10 been obvious that the net present value was negative.

11 I just want to remind the Board that I
12 took my base case from the literature and from this one
13 telephone call without deliberately trying to set up a
14 situation that was favourable or unfavourable to
15 anybody. This is the situation that I took on the
16 basis of the literature as I saw it.

17 Now, already we can see a couple things
18 from this. The net present value of the every
19 alternative is negative. The net present value of
20 Alternative C is dramatically more negative than the
21 net present value of Alternative B. And the net
22 present value of Alternative D, the one which violates
23 our constraint is also significantly less negative than
24 Alternative C.

25 So Alternative C in this case is the

1 worst of all possible worlds and by following it, we
2 would be getting a negative net present value of about
3 negative 122-million. Whereas if we followed
4 Alternative B1, we would be getting a net present value
5 of the area of 55-million. So the difference of the
6 order of \$70-million represents lost consumption
7 opportunities for the present.

8 MS. SWENARCHUK: Q. Dr. Muller, you
9 indicated that all alternatives have negative net
10 present value. What about Alternative A?

11 DR. MULLER: A. Alternative A in this
12 case, does not, I am sorry, all of Alternatives B1, B2,
13 C and D have negative net present value. Alternative
14 A has positive net present value, very small, but still
15 positive. And the reason is that it has recreational
16 uses and we are not using timber, using it for timber.

17 Now, a moral that I can draw from this is
18 first of all that the recreational values that I have
19 assumed are pretty small compared to the timber values.
20 I have separated out in this overhead the net present
21 value of the timber and the net present value of the
22 recreation and you can see that the net present value
23 of the recreation is tiny compared to the net present
24 value of the harvest. The main thing I would claim for
25 this example is that there must be areas in the

1 province...

2 MR. FREIDIN: I am sorry, I did not hear
3 that.

4 DR. MULLER: I am sorry, there must be
5 areas in the province--

6 MR. FREIDIN: Thank you.

7 DR. MULLER: --in which harvesting
8 generates a negative net present value. These will be
9 areas which are a long distance away from the mills and
10 areas in which it costs a great deal to access the
11 timber and areas in which -- sorry, a long way away,
12 costs a great deal to access and perhaps areas in which
13 the yield is low.

14 But the main item, the main conclusion I
15 draw from this is that there must be cases in which it
16 would be better to use the land for non-timber uses
17 rather than for silvicultural and harvest uses.

18 MS. SWENARCHUK: Q. Dr. Muller, I
19 suggest unless you have other comments on this page
20 that we stop there for a lunch break.

21 DR. MULLER: A. Certainly.

22 MADAM CHAIR: Dr. Muller, will your
23 evidence be finished when you have completed these
24 overheads?

25 DR. MULLER: Yes, it will.

1 MADAM CHAIR: And Dr. Morrison?

2 DR. MORRISON: I have something else.

3 MADAM CHAIR: We should be able to finish
4 this in an hour?

5 DR. MULLER: I would think so, yes. We
6 have laid a lot of the groundwork and I want primarily
7 to discuss the sensitivity analysis, that is the graphs
8 which show the sensitivity to changes in my
9 assumptions.

10 MADAM CHAIR: Okay. Mr. Hanna, you will
11 be able to begin this afternoon?

12 MR. HANNA: Yes, Madam Chair, and I
13 expect that having heard the evidence that I will be
14 quite brief. I may be able to complete today.

15 MADAM CHAIR: Thank you very much, Mr.
16 Hanna.

17 MS. SWENARCHUK: I just wanted to add,
18 Madam Chair, that I will be very briefly putting to Dr.
19 Morrison and Dr. Muller perhaps one question about
20 FFT's terms and conditions. That's the only additional
21 question I will have after the cost benefit analysis is
22 finished and I am telling you that partly so that you
23 will have them available too.

24 MADAM CHAIR: Okay. Thank you.

25 ---Luncheon recess at 12:00 p.m.

1 ---On resuming at 1:40 p.m.

2 MADAM CHAIR: Please be seated.

3 DR. MULLER: Madam Chair, Mr. Martel,
4 during lunch break, I was double checking to see why
5 those recreation benefits were so small on this slide
6 of net present values. And it does turn out that I
7 made an error in transcribing the number of hunter days
8 in calculating recreational benefits.

9 We checked against the most recent OMNR
10 statistics and it turns out that we had used the actual
11 kill rather than the number of hunter days in these
12 numbers on page 209 of the witness statement.

13 We have done a quick estimate of the
14 effect of that using the correct provincial averages
15 for numbers of hunter days, numbers of deer, numbers of
16 bear hunting days, and the net result is that we would
17 have expected 14,617 hunter days on a FMU of this size
18 based if it received exactly the provincial average
19 number of hunter days per hectare.

20 The result of that is that the
21 recreation -- now, I assumed for the purposes of this
22 cost benefit analysis 1,000 hunter days or 2,000 hunter
23 days depending on the presence of roads. So if you
24 wanted it to be at provincial averages, the numbers
25 should be about seven times bigger, in the cases of

1 Alternatives B1, B2, C and D and they should be about
2 14 times bigger in the case of Alternative A.

3 I want to stress that this reinforces the
4 case for recreational management rather than timber
5 management and I am going to be focusing almost
6 exclusively on timber management, the issues in the
7 remaining slides, but I do want you to be aware of the
8 fact that the numbers assumed for hunting days in this
9 representative case study are below the provincial
10 average for an area of that size.

11 Madam Chair and Mr. Martel, I now would
12 like to draw your attention to the overhead which
13 appears as number 11 on Exhibit 1695 C. This bar graph
14 represents the same computations as was made in the
15 base case, as were made in the base case, with the
16 exception that it is assumed that the price of wood at
17 the mill is \$50 per cubic metre rather than \$25 per
18 cubic metre.

19 Now, you will recall that this is twice
20 the price that was quoted to me by Canadian Pacific
21 Forest Products by telephone. But it yields a value of
22 wood which is approximately that for the Canadian
23 average of all pulp and paper companies. We have, I
24 believe, entered as an exhibit or have the extract from
25 the publication entitled Timber Sales and --

1 MS. SWENARCHUK: Q. It is Timber Values
2 and Stumpage in the 15 per cent export tax?

3 DR. MULLER: A. Yes.

4 Q. That is Exhibit 1697?

5 A. 1697, do you have a copy? Yes,
6 Exhibit No. 1697 is an extract from a report prepared
7 for the Industrial Restructuring Commissioner and it is
8 entitled Timber Values Stumpage and the 15 per cent
9 export tax, and it is prepared by David Quirin and
10 William Waters. And David Quirin I know of as a
11 well-regarded financial analyst, a professor at the
12 University of Toronto.

13 Appendix 3 of this document was directed
14 at deriving the value of wood for six major pulp and
15 paper producers. I will not take you through the
16 detailed steps followed by Professor Quirin and his
17 co-author, but I will inform you that they are
18 fundamentally the same conceptual steps as I would
19 recommend in calculating the value of wood.

20 And if you turn to the last page of the
21 package, Schedule III-1D, you will find a schedule
22 which gives the value of wood calculations for six
23 major Canadian pulp and paper producers in 1988. And
24 the bottom line of this schedule, line number 8, is the
25 net value of wood after stumpage per cubic metre. And

1 the average for six major Canadian pulp and paper
2 producers is \$19.33.

3 Now, Madam Chair, as I interpret the
4 methodology used in this report, the \$19.33 is the
5 private value to the company and to that you should add
6 the payment made to the Province in the form of
7 stumpage. Stumpage payments in Ontario for integrated
8 firms are running around \$7 per cubic metre. So if you
9 add that to the \$19 per cubic metre you get \$26 per
10 cubic metre as the net value of the wood including the
11 stumpage payments that are made to the Province.

12 Madam Chair, if you take \$50 wood at the
13 mill as in this example and you deduct my \$18.50
14 assumed logging costs and you deduct the \$7
15 transportation cost, you come up with \$24.50 as the
16 value of wood on the stump which would be comparable to
17 the \$26 which I just derived from this table.

18 I did not have this table available to me
19 when I prepared my cost benefit analysis. I was
20 gratified to find that the \$50 wood example corresponds
21 quite closely to the Canadian average value of wood.

22 I would stress that this is the Canadian
23 average and consequently includes British Columbia
24 where the average value of wood is certainly much
25 higher in many areas than it is in northern Ontario.

1 I conclude therefore it is a matter of
2 some interest to work out what is going on when the net
3 price at the mill -- when the price of the wood is at
4 \$50.

5 The overhead which I am looking at now
6 which is number 11... again, I should draw to your
7 attention the vertical axis is measured in millions of
8 dollars. It shows two sets of bars. One set of bars
9 is for recreation. Those bars are almost invisible,
10 they are very small, and I have just told you that I
11 would expect in most real cases recreational values to
12 be somewhat higher.

13 I want to focus primarily on the timber
14 values. By the timber values, I mean the net present
15 value of the benefits of the harvest as sold to the
16 mills, minus the costs, the present values of the costs
17 of harvesting, planting, building roads and extracting
18 the wood.

19 In this alternative, I think the most
20 significant thing is that the Forests For Tomorrow
21 preferred alternative, Alternative B1, has a net
22 present value which is almost the same as but slightly
23 higher than Alternative C. At values of wood of \$50 at
24 the mill in this particular case study, we get a higher
25 net present value out of Alternative B1 than we do out

1 of Alternative C which is large-scale clearcutting with
2 artificial regeneration.

3 If this graph were to fairly represent a
4 particular forest management unit, then I would
5 conclude that it was a better choice to maximize -- to
6 choose the modified clearcut 3 coupe harvest than the
7 large-area clearcut artificial regeneration scheme on
8 the basis of timber values alone and I would then not
9 have to say that there is a big value on recreation or
10 a big value on ecological sustainability that I have to
11 pull in to justify the use of a modified clearcut.

12 So what I am trying to say here is that
13 under some circumstances it seems quite reasonable to
14 believe that the net present value of a 3 coupe
15 alternative is greater than the net present value of
16 the current practice alternative.

17 I also draw your attention to the fact
18 that Alternative D has a significantly larger net
19 present value than any of the other three. I am
20 excluding the null alternative for a moment because it
21 is not directly connected with timber values.

22 What this says is that the crudely
23 measured net present value on the basis that we have in
24 the cost benefit study goes down rather dramatically
25 from somewhere in the neighbourhood of \$240-million to

1 somewhere in the neighbourhood of \$180-million if you
2 choose any of the alternatives, B1, B2 or C rather than
3 Alternative D.

4 Now, you will recall that Alternative D
5 involved non-sustainable forestry, it involved cutting
6 down all of the trees right away. So what this is
7 telling us is that these crudely measured market
8 signals are driving a rapid cutting down of the forest.

9 Now, if you pictured a private individual
10 bearing all of these costs and making decisions based
11 only on these costs, that private individual would
12 probably choose Alternative D, harvest everything and
13 not worry about regeneration.

14 We do not for a moment suggest that that
15 is the best thing to do. What we are suggesting is
16 that the public value of regenerating the forests is
17 imposing a constraint on net present value maximization
18 and the value of that constraint is about \$60-million
19 in the case of this forest management unit.

20 Now, I believe we can get more insights
21 into what is going on by looking at page 12, sorry,
22 yes. I am now looking at page 12 which is an overhead
23 entitled Timber Values, \$50 Wood. I remind you again
24 that the vertical axis of this should be measured in
25 millions of dollars, the net present value in millions

1 of dollars.

2 And what I have done here is break down
3 the net present value which is attributable to timber
4 into several categories. There is the value of the
5 wood that is harvested in the first harvest. There is
6 the value of the wood that is harvested in the second
7 harvest, second and all subsequent harvests. There is
8 the value of the secondary roads.

9 I might mention that for the purposes of
10 this particular graph, the cost of the tertiary roads
11 has been deducted from the first harvest, from the
12 value of the first harvest. I guess that probably did
13 not come through clearly.

14 The value of the first harvest includes a
15 deduction for the cost of the tertiary roads and in
16 addition there is an item here for the secondary roads.
17 And there is a little item here for protection
18 expenditures.

19 Now, what we see is that the present
20 value of the first harvest is significantly less for
21 the modified harvest natural regeneration than the
22 value of Alternative C. Alternative C has a present
23 value of about \$250-million for the first harvest
24 compared with just under \$200-million for the modified
25 cutting alternatives.

1 The trick is that Alternative C has a
2 dramatically lower, in fact, highly negative value on
3 the subsequent harvests. What is going on is that we
4 have got a very high value, a relatively high value for
5 the first harvest and a strongly negative value of the
6 second harvest, second and subsequent harvests.

7 Notice that Alternative C and Alternative
8 D have the same present value for the first harvests,
9 that is because the harvest schedule is essentially the
10 same in both cases.

11 So what is going on here, Madam Chair and
12 Mr. Martel, is that the reason that the net present
13 value of Alternatives B1, B2 and C are comparable when
14 you look at the overall net present value, is that the
15 higher net present value of the harvests under
16 Alternative C for the first harvest is offset by
17 negative present values for subsequent harvests.

18 Madam Chair and Mr. Martel, I am now
19 looking at page 13 of our overheads, the net present
20 value of the first harvest for \$50 wood. And what I
21 tried to do in this picture was to see whether road
22 costs were driving the comparisons and the significant
23 thing in this picture is at the scale of this drawing,
24 the road costs are almost the same, the present value
25 of the road costs are almost the same for all of the

1 alternatives.

2 I should remind you that in the
3 following, in this graph and in the following, I have
4 dropped the null Alternative A in order to focus more
5 clearly on the three harvesting alternatives.

6 MR. FREIDIN: Could you just put that one
7 up again, Dr. Muller?

8 DR. MULLER: Certainly.

9 DR. MORRISON: There is a difference
10 between what you have up there and what we have in the
11 copy.

12 MR. FREIDIN: I was wondering whether
13 that is of any significance.

14 DR. MULLER: Let me just double check.
15 It is page 13, is it not?

16 DR. MORRISON: That's right.

17 DR. MULLER: Oh, yes, thank you for
18 drawing that to my attention. The vertical scale on
19 page 13 is incorrect, and I believe in package 1696 C
20 we have the corrected one, don't we? In 1695 C.

21 MR. FREIDIN: The vertical bars are also
22 different in terms of their hash delineation.

23 DR. MULLER: Okay, now, the page 8 of the
24 1695 B has a copy of the one that is currently being
25 projected. Page 8 of 1695 B has a copy of the overhead

1 that is currently being projected.

2 MR. FREIDIN: So we wanted 16 --

3 DR. MULLER: Excuse me.

4 MS. SWENARCHUK: Q. Dr. Muller, we can
5 run copies at the break of the correct page.

6 DR. MULLER: A. Well, it is even worse
7 than that because when I was Xeroxing these and
8 preparing the overheads, I Xeroxed the wrong one.

9 Q. Right.

10 A. And let me just say that on the one
11 that is currently being projected, these net present
12 value bars have all been shifted over one column. So
13 that there is no net present value bar for Alternative
14 B1, there is a net present bar for an alternative over
15 here which is not existing. So what has happened is
16 that is a picture of the state of my mind at eleven
17 o'clock in the evening, one of a few nights ago.

18 And I suggest therefore that we direct
19 our attention to the one in your original package which
20 is page 13.

21 MADAM CHAIR: Which exhibit?

22 DR. MULLER: This is page 13 of package
23 1695 C.

24 MS. SWENARCHUK: Q. Pardon me a moment,
25 Dr. Muller.

1 DR. MULLER: A. That is what I would
2 like to do. I am sorry, I must apologize to the
3 parties. What we have are two incorrect graphs and
4 when I tried to repair graph 13 on page 13 I did not
5 repair it properly. The message I get from it will be
6 basically the same, but I would like to have the
7 opportunity of showing you the correct picture. The
8 message I am going to draw from it is that road costs
9 are not the dominating force in this in determining the
10 net present value of the first harvest.

11 Now, Madam Chair and Mr. Martel, I would
12 like to draw your attention to number 14, the graph on
13 page 14 of the collection, Exhibit 1695 C. It is
14 entitled Benefit of Subsequent Harvests and what I am
15 trying to do with this graph is give you a feeling for
16 what is going on with regeneration expenditures in this
17 model.

18 The vertical scale on this diagram is
19 different. It is the net present value in terms of
20 dollars per hectare evaluated at the point when you
21 have just cut down the forests and you are about ready
22 to regenerate a new forest.

23 What is going on here, and it is also the
24 net present value of one further rotation. What is
25 going on here is that Alternative B1 has a very small

1 positive net present value of the expected stumpage.
2 But it costs almost nothing to produce that stumpage.
3 And so the net present value of the subsequent harvests
4 is positive. The same thing can be said for
5 Alternative B2.

6 For Alternative C, we have a vertical
7 diagonally slashed bar which shows a positive value of
8 stumpage of the order of \$100 per hectare, but it is
9 greatly offset by a huge and negative net present value
10 of silvicultural expenses.

11 So the point is that intensive forest
12 management in this example yields to some increase in
13 the value of the stumpage but it costs so much in terms
14 of present values that the net value, net present value
15 is strongly negative.

16 Madam Chair and Mr. Martel, this is not
17 an unusual result. I am presenting it in this fashion
18 to try to dramatize it. But it is true that quite
19 often people come up with negative net present values
20 for silvicultural expenditures even when they include
21 values of wood which are significantly higher than the
22 values of wood that we have adopted.

23 Now, the conclusion so far for \$50 wood,
24 I would say, is that the net present -- that if you
25 impose the constraint that we have sustained yield,

1 that is if we rule out Alternative D, then the modified
2 cutting, the modified cutting option on this timber
3 management unit can be justified in terms of timber
4 values alone.

5 And I am not claiming that that will be
6 the case on all timber management units. I am simply
7 claiming that an evaluation, a case by case evaluation
8 of forest management units would almost certainly find
9 that my numbers are at all representative, you would
10 almost certainly find some cases in which the net
11 present value was higher if you follow the modified
12 cutting techniques.

13 Now, the remainder of my evidence is
14 directed at asking the question and answering the
15 question of whether the result that I have just shown
16 you for \$50 wood is an obscure result that just happens
17 to be the case, or whether it is a conclusion which is
18 likely to hold more generally. And to do that I have
19 tried what is known as sensitivity analysis, that is I
20 have tried to calculate what the results would be if we
21 changed some of the critical assumptions that have been
22 made in this analysis.

23 Now, as you will recall, I assumed to
24 begin with a 5 per cent interest rate and I am now
25 looking at overhead number 15 which is entitled

1 Interest Sensitivity with ACE. ACE stands for
2 allowable cut effect. And you may recall that I laid
3 some stress on the fact that I assume public policy was
4 dictating a rotation of 100 years for the first harvest
5 on the modified cut and 80 years for the more intensive
6 management.

7 Now, I would like to draw your -- what I
8 have on this diagram, the \$50 wood base case is in the
9 centre, 5 per cent interest rate with a vertical bar
10 for the 3 coupe harvests slightly above the vertical
11 bar for the current practice Alternative C.

12 In between the two is a slightly higher
13 vertical bar showing the two 2 coupe harvest has an
14 even higher net present value. And on the right is a
15 vertical bar indicating that Alternative D has an even
16 higher net present value.

17 Now, I would like to point out that I
18 have changed the vertical access here to annualized
19 benefits and roughly speaking, the annualized benefit
20 is -- not even roughly speaking, it is the net present
21 value of the option multiplied by the interest rate.

22 MADAM CHAIR: Excuse me, Dr. Muller, your
23 sensitivity analysis, will that give us more insights
24 into the situation with respect to forest management or
25 is it simply to support your argument that the analyses

1 can be relied upon?

2 DR. MULLER: I believe it will give you
3 insight into forest management.

4 MADAM CHAIR: All right, go ahead.

5 Excuse me, are any parties going to be
6 questioning Dr. Muller on his sensitivity analysis?

7 MR. COSMAN: We may be after we hear him.

8 MADAM CHAIR: All right. Go ahead, Dr.
9 Muller.

10 DR. MULLER: I will try to draw out what
11 I think are important forest management results. I
12 just wanted to say this, the height of these bars then
13 represents a benefit measured in terms of dollars per
14 year that is flowing from this forest management unit.

15 Now, if you look at a one per cent
16 interest rate, you will notice that the bar for
17 Alternative C is much higher than the bars for
18 Alternative B and the Alternative D. What that says is
19 that intensive management of the kind that I assert is
20 current practice looks attractive when interest rates
21 are extremely low.

22 And fundamentally that means if you can
23 borrow the money to do the intensive planting
24 silvaculture and you virtually do not have to pay any
25 interest for it, why then the intensive silviculture

1 looks like a good deal. This is why I am saying it is
2 insights about the forest management.

3 But if you have a much higher interest
4 rate, the gap is not so great. At a higher interest
5 rate of 9 per cent, the 3 coupe is slightly less than
6 the 2 coupe system, sorry, the 3 coupe system is
7 slightly less in annualized value than the current
8 practice and the 2 coupe is slightly greater than both
9 of them.

10 So what that shows is that the interest
11 rate affects the ranking of these projects, but at
12 reasonably high -- and at reasonable interest rates,
13 the modified cut is completely competitive with the
14 large area clearcut.

15 Now, I want to draw your attention to the
16 next overhead which is page 16 and the difference
17 between page 16 and page 15 is that I have insisted on
18 page 16, the one you are looking at now, I have
19 insisted that the first rotation be undertaken in 100
20 years in all cases.

21 In other words, I have taken away the
22 allowable cut effect, I have assumed that we are going
23 to cut down the forest at the same rate, the current
24 forest at the same rate in all management alternatives.
25 Now, the large area clearcut method remains slightly

1 preferred but not nearly as dramatically preferred at
2 an interest rate of 1 per cent.

3 At an interest rate of 5 per cent and an
4 interest rate of 9 per cent, the modified clearcut
5 methods are noticeably -- sorry, the modified cutting
6 natural regeneration methods are noticeably preferred
7 to the large area clearcut. And that is because the
8 main advantage of the large area clearcut method, the
9 main advantage on a financialal analysis is that you
10 accelerate the first harvest, you are being permitted
11 to cut it down in 80 years rather than 100 years.

12 When you restrict -- when these
13 management alternatives compete in terms of an equal
14 number of years for the first harvest, the results are
15 more favourable towards the modified cutting
16 techniques. I remind you that these slides are for
17 timber values only, they do not refer to recreational
18 values.

19 Now, Madam Chair and Mr. Martel, I want
20 to turn to the slide, the overhead which is number 17
21 in your package and this shows differences in
22 annualized benefits at different values of the wood at
23 the mill. Now, what we have going on here is a
24 demonstration that the higher the price at the mill,
25 the more competitive is intensive management.

1 So in my base case, modified cutting,
2 Alternative B was slightly preferred to Alternative C.
3 At a price of \$75, Alternative C has a somewhat greater
4 net present value than the modified cutting ones. At a
5 price of \$25 they are all negative but the intensive
6 method is noticeably less preferred than the other two.

7 So I conclude here, I mean, this is
8 another way of saying when wood on the stump has a
9 higher value, it is more likely that the intensive
10 management techniques are justified on net present
11 value grounds.

12 I now want to turn to number 18, price
13 sensitivity with no allowable cut effect. Now, very
14 briefly, the message I want to derive from this
15 overhead is that once again, the advantage of a high
16 price for the wood seems to be closely associated with
17 the advantage of having an accelerated harvest.

18 So that if I make the alternatives
19 compete on the basis of a 100-year cutover for the
20 first harvest, the net present value of the intensive
21 management alternative is less than the net present
22 value of the modified alternatives even in the case of
23 \$75 wood at the mill. So I do believe that these are
24 giving us some insight into what is going on in terms
25 of forest management decisions.

1 The one last pair of pictures that I
2 would like to show you are 19. 19 is natural yield
3 sensitivity with an allowable cut effect. What I am
4 trying to get at here is what does the variation in the
5 natural fertility of the forest do for us in terms of
6 choosing management techniques.

7 And this particular graph indicates that
8 on the basis of timber values alone, when the
9 fundamental natural yield is 75 cubic metres per
10 hectare and when it is 125 cubic metres per hectare,
11 the modified cutting techniques dominate the large area
12 clearcut and that is particularly true with the low
13 natural yield at 75, but it is not true at the high
14 natural yield of 175. At a high natural yield of 175,
15 the large area clearcut marginally exceeds the net
16 present value of the modified cuts.

17 I should mention to you that in
18 developing this example, I have maintained my
19 assumption that intensive forestry increases the
20 natural yield by 50 per cent and that Alternative D
21 reduces the natural yield by 20 per cent. So that what
22 is going on here is I have the same percentage gap
23 between the alternatives but larger gaps in terms of
24 cubic metre per hectare.

25 So the message that this gives us is that

1 intensive management is best suited to sites of very
2 high natural productivity on a net present value
3 criteria. And that there are many -- presumably there
4 are many sites where the natural yield is relatively
5 low where modified cutting techniques are important,
6 are clearly preferred on this basis.

7 Now, finally, I would like to turn to
8 number 20. I am sorry, the legend which says 1, 2, 3
9 and 4 on this overhead, of course number 1 is
10 Alternative B1, number 2 is Alternative B2, number 3 is
11 Alternative C and number 4 is Alternative D.

12 In this picture I have assumed different
13 values for the natural yield in the forest, but I have
14 insisted that the cut be undertaken in the 100 years in
15 all management alternatives. So I have eliminated the
16 annual cut -- the allowable cut effect, and the
17 important point is that even at 175 cubic -- even when
18 the natural yield is 175 metres cubed per hectare and
19 the artificial regenerating yield is 50 per cent higher
20 than that, it is still not preferred to the modified
21 cut, modified cut natural regeneration.

22 So what is going on in all of these
23 pictures is the message that if there is a public
24 policy decision to let us cut down the current harvest,
25 current forest faster because of the assumed ability of

1 intensive management to produce an 80-year rotation, it
2 is that acceleration of the current harvest that is
3 yielding the apparent advantages of large area
4 clearcutting when indeed large area clearcutting has no
5 advantage at all.

6 Now, Madam Chair and Mr. Martel, I would
7 like to conclude my evidence, at least my presentation,
8 with two summaries and these summaries appear in
9 package 1695 B at the end. The one I am looking at now
10 is page 9 of package 1695 B. It is headed Conclusions:
11 Sensitivity Tests, and my main conclusion is that for
12 this particular case study and looking at timber values
13 only, the modified clearcut Alternative B has a higher
14 net present value than Alternative C, that is it
15 dominates Alternative C except when interest rates are
16 very, very low or actually when they are very, very
17 high.

18 Alternative C is also preferred on these
19 calculations if the mill price is very, very high, that
20 is if the value of the wood is very high and if the
21 yield from intensive management is very, very high.
22 That is one conclusion.

23 The second conclusion is that the main
24 advantage of the current practice technique is a
25 shorter rotation period for the first harvest.

1 Now, Madam Chair, I want to draw some
2 conclusions from this case study and I want to be clear
3 about the kind of conclusions I am drawing. The case
4 study was hypothetical in the sense it does not belong
5 to a precise forest management unit. The numbers I
6 have used are reasonable in the sense that they are
7 drawn from the literature.

8 The conclusions that I reach are first of
9 all that it is quite practical to set up a simple kind
10 of cost benefit analysis. You could, without excessive
11 difficulty, set up this kind of thing on a computerized
12 work sheet. It took me, starting from scratch, it took
13 me about three or four days to get the system up, the
14 work sheets up, to prepare this cost benefit analysis.

15 Obviously you would want to invest
16 considerably more time in making very sure that your
17 information was correct and that all the calculations
18 were correct within the cost benefit analysis.

19 The second conclusion I draw from
20 analyzing the figures on the assumptions -- well, no,
21 this no longer requires assumption.

22 The critical factors appear to be that
23 the choice between intensive management and extensive
24 management strategies clearly depends on the value of
25 the wood. When the value of the wood is very high,

1 intensive works better. It depends on the rate of
2 interest that you apply, and it depends on the rotation
3 periods which you allow, particularly the rate at which
4 you allow people to cut down first forests.

5 The third conclusion I reach is that the
6 preferred use of an area of forest may easily exclude
7 timber if we are dealing with low mill prices or
8 conversely high costs of getting the wood to market,
9 high logging access and transportation costs. And
10 especially if recreational benefits are higher for a
11 virgin forest than they are for a cutover forest.

12 Now, Madam Chair and Mr. Martel, I would
13 like to draw your attention to the very last overhead
14 in package 1695 B which I am projecting now and which
15 is entitled General Conclusions.

16 These conclusions are the conclusions I
17 personally draw on the basis of the witness statement
18 that Dr. Morrison and I have prepared. I would like to
19 leave you with a number of basic messages.

20 One is that central to economically wise
21 management of the forest resource is attention to the
22 concept of net present values.

23 Secondly, to the best of our ability to
24 interpret current practices, these practices as
25 described in the environmental assessment document and

1 elsewhere do not seem directed at maximizing net
2 present value of the social benefit of the forest.

3 The third will probably draw fire. I
4 have phrased it as timber management does not
5 contribute greatly to provincial goals. Now, I am
6 thinking here particularly of the evidence that Dr.
7 Morrison produced which indicates that Provincial
8 government expenditures on forest management greatly
9 exceed Provincial government revenues from forest
10 management.

11 And consequently at the time of real
12 constraint in government budgets, the financing of
13 silviculture represents a subsidy to industry which is
14 being taken away from our ability to devote
15 expenditures to other important social goals.

16 Another theme with respect to the purpose
17 of these hearings was that in environmental assessment,
18 you ought to have some reasonable economic analysis and
19 for the reasons that we have elaborated upon, we see
20 some major problems with the economic analysis. I am
21 sorry, this slide says poor and faulty analysis in the
22 class environmental assessment. I want it very clear
23 on the record that we are referring to poor and faulty
24 economic analysis, not any other kind of analysis.

25 We believe on the basis of our

1 investigation and what we have learned from preparing
2 this report that requiring simple cost benefit analyses
3 at the forest management unit level would improve the
4 efficiency of forest management and I believe would
5 lead to decisions which better preserved environmental
6 values in many cases.

7 So I believe that it would be reasonable
8 to require as part of the environmental assessment
9 process that cost benefit analyses, social cost benefit
10 analyses be drawn up for each management level, forest
11 management unit.

12 One of the critical issues is willingness
13 to pay for non-timber uses. We have established I
14 think in our witness statement that there are well
15 developed and generally accepted techniques for trying
16 to get at willingness to pay for non-timber values.

17 Our recreational advice to you is that
18 these techniques should be developed at the Provincial
19 level, that the Ministry of Natural Resources should
20 devote attention to investigating in a manner which is
21 consistent with currently developed theory, willingness
22 to pay for non-timber uses. And that information could
23 guide future development of forest management.

24 Finally, I think it is quite clear that
25 our current state of knowledge is weak on what economic

1 value to place on certain ecological services provided
2 by the forest. And in particular, it is services as a
3 repository of biological information, its existence as
4 a wilderness, its continued existence for future
5 generations.

6 And I think it's clear that if you do not
7 constrain the net present value calculations in order
8 to take account of these ecological services, you are
9 going to wind up with net present value, net present
10 worth calculations which indicate cutting down the
11 forest very rapidly and not putting much effort into
12 maintaining its ecological stability.

13 And so I would advise you not to adopt as
14 your sole criteria the maximization of net present
15 value as measured by simple and relatively crude
16 economic indicators because we know that that measured
17 net present value does not really measure the true
18 natural level of comfort that we are trying to
19 maximize.

20 So it is important in our analyses to
21 protect certain uses that are not clearly protected
22 within the general framework.

23 Madam Chair, Mr. Martel, that concludes
24 my presentation. If you have any questions, otherwise
25 I will sit down and let Mrs. Swenarchuk continue.

1 MADAM CHAIR: Thanks, Dr. Muller.

2 MS. SWENARCHUK: Yes, I just have one
3 brief question related to the terms and conditions,
4 Madam Chair.

5 Q. Dr. Muller and Dr. Morrison, I will
6 ask you jointly, you have reviewed Forests For
7 Tomorrow's terms and conditions, have you not?

8 DR. MULLER: A. That's correct.

9 Q. And to do this as quickly as
10 possible, Madam Chair, I will not refer in any great
11 detail to the section numbers which I reviewed with the
12 witnesses again today at noon. I guess I should ask
13 each of you to reply individually.

14 You will recall that we reviewed Section
15 14(1) of the terms and conditions which has to do with
16 the constraint of including ecological sustainability
17 of forests in deciding silvicultural prescriptions. We
18 reviewed term and condition 33(1)(B) which has to do
19 with planning for road corridors and the steps to be
20 required in that planning process.

21 We reviewed Article 52(3)(A)(iv) which
22 has to do with planning procedures to be carried out in
23 the case of a major amendment. And we reviewed term
24 and condition 92, Section 3 which has to do with term
25 and condition 92 having to do with the proposed changed

1 planning process that Forests For Tomorrow advocates.

2 Section 92(3) refers to the inclusion on planning teams
3 of individuals with economic skills.

4 Section 92(7) has to do with the guiding
5 principle for the selection of preferred alternatives,
6 the overall goal being to provide the greatest
7 long-term net public benefit in an environmentally
8 sound manner, the costs and benefits of resource use
9 and non-market values shall be considered within a
10 framework of environmental protection.

11 And Article 92(8) defines terms including
12 net benefit and net public benefit and non-market
13 values. And are you in agreement with these proposed
14 terms and conditions, Dr. Muller?

15 A. With the proviso that we interpret
16 cost benefit analysis and social cost benefit analysis
17 and not private cost benefit analysis.

18 Q. Yes, the term used in Article 92 is
19 public benefit.

20 A. That's correct. Then I agree with
21 the spirit of these terms and conditions.

22 Q. Dr. Morrison?

23 DR. MORRISON: A. I agree also.

24 MS. SWENARCHUK: Thank you. That
25 concludes our direct evidence, Madam Chair.

1 MADAM CHAIR: Thank you, Ms. Swenarchuk.
2 Mr. Hanna, should we take the afternoon break before we
3 get started?

4 MR. HANNA: Whatever is convenient for
5 you, Madam Chair. We are ready to go now. If you want
6 to break now, that is fine with me.

7 MADAM CHAIR: This is normally the time
8 we take. Be back in 20 minutes.

9 ---Recess at 2:40 p.m.

10 ---On resuming at 3:10 p.m.

11 MADAM CHAIR: Please be seated.

12 Mr. Hanna?

13 MR. HANNA: Thank you, Madam Chairman.

14 CROSS-EXAMINATION BY MR. HANNA:

15 MR. HANNA: Q. Good afternoon, Dr.
16 Muller, Dr. Morrison.

17 DR. MULLER: A. Good afternoon.

18 Q. I would like to discuss some of the
19 matters that you have just discussed while it is fresh
20 in my mind and then I would like to turn to Exhibit
21 1695 C, please. And specifically to page 10 of that
22 exhibit.

23 Dr. Muller, you may have misspoke
24 yourself here but I just wanted to make sure that I
25 understood what you said. You were speaking about this

1 exhibit, you had said that the net present value of
2 timber was far greater than the value of recreation.
3 Now, did you mean there it is far greater but it is
4 negative?

5 A. That's correct.

6 Q. Now, I tried to distill in my mind
7 the message that was contained in 1695 C and I just
8 want to make sure I understood it. I am going to put
9 this proposition to you and I want to make sure that it
10 accurately reflects what you are saying to us. 1695 C
11 as I understand it is based on a hypothetical example,
12 correct?

13 A. That's correct.

14 Q. And you said that there is
15 potentially circumstances where modified cutting of the
16 nature that is proposed by FFT may in fact be
17 preferable in terms of net present value to
18 conventional clearcutting and artificial regeneration
19 or without regeneration?

20 A. What the case study indicates is that
21 modified clearcutting with natural regeneration may be
22 preferred to large area clearcutting with artificial
23 regeneration even when the decision is made only on
24 timber values.

25 Q. Now, would you agree with me that it

1 may be the case that in some forest management units
2 that there may be circumstances where in some cases
3 using a modified cut may give you the highest net
4 present value in terms of simply timber values and in
5 other areas within the same forest management unit, the
6 alternate, an alternate approach may be preferred?

7 A. That's correct.

8 Q. And is it fair then to say that it
9 would be responsible analysis not to look solely at
10 using all modified clearcuts or all conventional
11 clearcuts in a forest management unit, but that one
12 should look at a combination, not only just the
13 extremes but intermediate combinations of those
14 techniques?

15 A. I believe in introducing the case
16 study, I noted that the case study applied to the
17 entire forest management unit only but that was a
18 simplification and that I believe that in normal cases
19 there would be areas of the FMU which might require
20 separate treatment. So I certainly agree with the
21 proposition that the appropriate management technique
22 be different in different areas.

23 Q. Within an FMU?

24 A. Within an FMU.

25 Q. And that in order to obtain the best

1 result from a net social benefit point of view, one
2 must look at various silvicultural options on various
3 sites and various combinations of those in order to
4 arrive at the best mix?

5 A. Yes, I think that one looks at as
6 many alternatives as appear sensible to look at and
7 used in combination or singly, then you have to make a
8 judgment. In the first instance you should be
9 calculating the easily measured net present value of
10 those uses. I remind you that I am not advocating that
11 the decision be made exclusively on the basis of easily
12 measured costs.

13 Q. Yes, I understand that.

14 Now, in a number of the examples that you
15 showed in your sensitivity analysis, you showed with
16 and without ACE, correct?

17 A. That's correct.

18 Q. Now, I was not clear on your position
19 whether you felt ACE should be permitted as a
20 reasonable basis to estimate or to, number one, decide
21 upon the harvest level, and number two, to estimate net
22 present value?

23 A. I think that if there was no public
24 policy constraint imposed that continuous harvest is
25 required, then imposing an allowable cut effect will

1 tend to minimize, or will tend to minimize the net
2 present value of the forest estate. I think I better
3 rephrase that.

4 Net present values will be highest if you
5 make your decisions without considering allowable cut
6 effects, if you allow, that is net present values will
7 be highest if you do not restrict current harvesting on
8 the basis of future plants.

9 Q. Slowly there. It seems to be a
10 contrast. I just want to make sure we do not get
11 balled up here.

12 A. Yes, let us try it again.

13 Q. Perhaps we can look specifically at
14 Exhibit 1695 C and perhaps one of your examples,
15 perhaps we can look at the interest sensitivity
16 analysis which is on pages 15 and 16. Now, it looks to
17 me looking at pages 15 and 16 that with ACE, you end up
18 with a higher net present value?

19 A. For which?

20 Q. For I think virtually all of the
21 cases and that is because with ACE, you are allowed to
22 harvest more timber now and you do not have to defer
23 that harvest to the future?

24 A. Let me put it this way. On page 15
25 in which we have an allowable cut effect, we are

1 cutting the forest at different rates. At 100 years
2 for the -- we are cutting over the entire first forest
3 in 100 years in Alternative B and in 80 years in
4 Alternative C.

5 Now, if you are going to allow the first
6 forest to be cut over in 80 years for Alternative C,
7 you might reasonably ask why not let it be cut over in
8 80 years for Alternative B as well.

9 Q. No.

10 A. Well, one might, I am not saying that
11 you would. If you did so, if you allowed the first,
12 the Alternative B to occur, to be spread over 80 years
13 instead of 100 years, you would noticeably increase the
14 present value of Alternative B.

15 Q. I appreciate that.

16 A. But at the end of the alternative, at
17 the end of the 80 years, you would not have any wood to
18 harvest.

19 Q. Yes.

20 A. Now, if public policy says that we
21 must maintain continuity of harvest and therefore we
22 are not going to admit the accelerated harvest in the
23 case of B but we will admit it in the case of C, then I
24 would agree with that ACE should be considered, that
25 the allowable cut effect should be considered.

1 But I think that accepting allowable cut
2 effects as a sensible restriction in your present value
3 calculations presumes that you accept the evidence that
4 the natural regeneration will be successful and that
5 you in fact can get 80-year future, that you can get a
6 future forest in 80 year's time and that it will have
7 the high yield which I have attributed to it.

8 In other words, if you are going to allow
9 the allowable cut effect and if you are going to allow
10 the accelerated harvest because of it, I think you
11 ought to have high confidence in the predictions that
12 the second forest will be around when you want it in 80
13 years.

14 DR. MORRISON: A. Just let me interject
15 here. I think you are referring to the artificial
16 regeneration rather than natural regeneration.

17 DR. MULLER: A. Yes, the artificial
18 regeneration.

19 Q. Yes, I understand that, and I was
20 under the understanding that ACE only applied when you
21 had artificial regeneration and I want to just make
22 sure there is no misunderstanding here in terms of this
23 discussion.

24 Is it your understanding that the
25 allowable cut effect is basically a process whereby you

1 are projecting an increase of yield in the future due
2 to forest investments and on that basis that is the
3 reason you are allowed to increase the harvest?

4 A. In the context of the model which I
5 have presented to you, allowable cut effect is based
6 entirely on the presumption that a second growth forest
7 will be available 80 years under artificial
8 regeneration and it will not be available until 100
9 years after the first cut under the natural
10 regeneration. That is what is driving the results
11 which I have discussed.

12 Q. Are you suggesting that there is an
13 allowable cut effect potentially with natural
14 regeneration and I will even help you, it is my
15 understanding there is not, so I just want to make sure
16 I understand your basis for that.

17 A. I hope that I am not using allowable
18 cut effect in a way which is misleading people. The
19 only meaning I attach to allowable cut effect in this
20 particular example is associated with the fact that I
21 have allowed the first forest to be cut down in the
22 same amount of time that it takes to grow the second
23 forest. If you grow the second forest in 80 years,
24 then I allow you to cut down the first forest in 80
25 years. If you grow the second forest in 100 years,

1 then I allow you to cut down the second forest in 100
2 years.

3 Q. There is another element to allowable
4 cut effect in some of the material that I have seen and
5 that is if you are going to change the yield as a
6 result of your investment in the forest, that that is
7 also a part of the allowable cut effect and that can be
8 factored in in terms of the rate at which you cut the
9 existing forest. Was that included in your analysis?

10 A. You are correct in saying that that
11 is included in some of the literature and I want to
12 make it very clear that I did not include that aspect
13 of allowable cut effect in my calculations.

14 Q. Now, back to the question. You had
15 said that you do agree with the use of the allowable
16 cut effect if you are very confident that you are going
17 to get the results that you are projecting, is that
18 fair, that is what you said?

19 A. If you are confident that you are
20 going to get the results that you are projecting and if
21 you believe that the public policy requiring no decline
22 in harvest is appropriate.

23 Q. Fine, accepting those two provisions,
24 let us put into the situation the fact that there is
25 undoubtedly some risk associated with producing the

1 projected level of production in terms of both the
2 harvest rate, in terms of the rotation age and the
3 yield. In the cost benefit analysis approach that you
4 have brought forward, is it capable of dealing with
5 those types of risk?

6 A. The analysis that I have presented is
7 the simplest possible analysis in my opinion. It is
8 possible to extend it to cover a good many kinds of
9 contingencies at the expense of getting a little bit
10 more complicated. It is quite possible, for example,
11 to try to quantify the risk to say well we are going to
12 achieve high yields with a certain probability and
13 achieve low yields with a certain probability.
14 And to calculate what is known as I am sure you know
15 the expected value or the probable value of that
16 result, and then say that the objective is to maximize
17 expected net present value.

18 Q. Is that standard practice in your
19 experience in dealing with these types of situations
20 where there is some uncertainty and risk associated
21 with these types of investments?

22 A. I think that is the standard next
23 step up in conducting cost benefit analysis.

24 Q. I realize that the example that you
25 have brought forward is hypothetical. If you were

1 faced with an example of trying to project future
2 yields and trying to deal with the ACE effect, would
3 you want to see that expected value of the risk of
4 potential failure incorporated as part of the analysis?

5 A. If on the advice of foresters I was
6 informed or I understood that the risk was substantial
7 and might easily affect or there was a good chance it
8 would affect my decision, then I would want to include
9 it in my analysis.

10 Q. Can we turn to Exhibit 1695 B,
11 please, page 10. And these were your conclusions from
12 the sensitivity tests.

13 A. I think they disappeared on mine.
14 Yes.

15 Q. Now, my question was dealing
16 particularly with the critical factors that you have
17 raised there in terms of value of wood, rate of
18 interest and rotation period.

19 MR. FREIDIN: Which page are you looking
20 at, I am sorry, Madam Chair.

21 MADAM CHAIR: Page 9.

22 MR. FREIDIN: Thank you. Sorry to
23 interrupt.

24 DR. MULLER: It is the second to the last
25 page.

1 MADAM CHAIR: Page 9 of the conclusions
2 from the sensitivity analysis and page 10 of the
3 overall conclusions.

4 MR. HANNA: Q. The critical factors you
5 have listed there, Dr. Muller, would you agree that
6 there may be other factors that are equally important
7 if you incorporate non-timber values into the equation,
8 for example, the willingness to pay values that you
9 have estimated for, for example, hunting and fishing
10 activities?

11 DR. MULLER: A. Well, Mr. Hanna, the
12 sensitivity tests were conducted on the basis of timber
13 values alone.

14 Q. I understand.

15 A. And consequently factors related to
16 non-timber values would not directly enter this set of
17 conclusions. However, I agree with you that the
18 non-timber values may be quite important in some cases
19 and consequently I would recommend that they be taken
20 into account.

21 Can I just add that part of my strategy
22 in setting up things this way is to say that if we can
23 rule out environmentally damaging activities on the
24 basis of timber values alone, then we may as well rule
25 it out right away, not worry too much about the more

1 disputable environmental values.

2 The real crux of the matter comes when
3 we, on the basis of timber values, we choose intensive
4 and on the basis -- and we are wondering whether or not
5 the environmental costs and other costs are so great as
6 to make us change that decision.

7 Q. So then it is fair to say that the
8 conclusions you have raised here are specific to the
9 case study and are not universal conclusions that would
10 be applicable in all forest management units in a
11 practical situation?

12 A. I do not think it would just be fair
13 to put it exactly that way. I think that the
14 conclusions which I have listed on that overhead will
15 be important in any and will hold in virtually every
16 cost benefit analysis, but in more extended cost
17 benefit analyses, there may be other factors which are
18 also important to take into account.

19 Q. Now, you had indicated in your
20 evidence that, and I believe it is in your witness
21 statement on page 123, that there is no one correct way
22 to conduct a cost benefit analysis. And as I
23 understood this, and I want to clarify this and my
24 understanding of this, you are not suggesting that
25 there are many alternative approaches to the

1 organization, the organization of the information is
2 consistent regardless of whether it is a complicated or
3 simple cost benefit analysis, the difference is the
4 level of detail, is that the message that you are
5 trying to leave us with 5.1.3?

6 A. I think that is fundamentally the
7 message. That is, I would see the main difference
8 being the amount of detail and the detail can get
9 overwhelming fairly quickly. And that is the main
10 difference.

11 Q. All right. Now, as a way to try and
12 come to a reasonable decision as to the appropriate
13 level of detail, I am going to put a proposition to you
14 and see if you agree with it. Would you agree that
15 initially the first step in an analysis, a cost benefit
16 analysis, would be to take the most simple case that
17 uses the most easily quantified results and determine
18 what appears to be the best alternative on that basis.

19 And if on that basis alone given what you
20 know about the direction of the other things that are
21 quantified in the analysis, that preferred alternatives
22 will likely be the preferred alternatives for those
23 other uses, that that would be a reasonable basis to
24 decide upon the appropriate level of analysis at that
25 point?

1 A. I think you have put it quite well.
2 I certainly agree that you should start as simply as
3 possible and only complicate matters when it seems that
4 there is some real gain in testing your decision by
5 introducing the complications.

6 Can I just state though that one
7 complication I really would like to always see included
8 is the stating of costs gross of government subsidies,
9 that is to say I would not like to see people starting
10 their cost benefit analyses on the basis of private
11 costs to the pulp and paper companies, ignoring the
12 fact that there are substantial subsidies being given
13 for road construction and for silviculture.

14 Q. Okay. And then in the circumstance
15 where there is not a clearly superior alternative,
16 would you agree that it is reasonable to continue to
17 add in variables until a clearly superior alternative
18 has become apparent, as a reasonable way to come to the
19 appropriate level of analysis?

20 A. I think you are right. I would like
21 to qualify a little bit. Suppose we have a situation
22 in which the measured benefits of modified clearcut,
23 modified harvest with natural regeneration and large
24 area of clearcut with artificial regeneration are
25 comparable, they are within a few per cent of each

1 other.

2 It might easily be the case, it seems to
3 me, that on the basis of the kinds of evidence that
4 have been presented at this hearing, you would say that
5 the unmeasured, unevaluated ecological services of the
6 forest should dominate and that you should choose the
7 harvest method that protects them. And I do not think
8 that you are likely to change that conclusion by adding
9 bits and pieces of detail to the timber value
10 calculation.

11 Q. Yes, I was actually coming at it from
12 the other view and that was that you have indicated and
13 I think the Board has certainly heard much evidence and
14 in terms of the fact that the timber side is much
15 easier to quantify than the non-timber side and the
16 premise I was putting to you was that if it appears
17 that the timber values prefer one alternative that may
18 not be what you expect to be giving you the highest
19 value in terms of the non-timber benefits, then you
20 would progressively try to put the non-timber benefits
21 into the cost benefit analysis. And if after going
22 through that exercise and all of the non-timber values
23 that are reasonable to quantify, I say the pendulum has
24 not swung, then you would basically have gone as far as
25 is reasonable to go?

1 A. I think you would have gone as far as
2 it was reasonable to go in terms of introducing more
3 detail.

4 Q. That is my point.

5 A. It is not clear to me that they would
6 reverse your decision though because as I say, you
7 might be in a situation in which you are dealing with
8 unevaluated benefits which are so obviously important
9 that it is worth the indicated sacrifice of measuring
10 net present value.

11 Q. My question to you was simply a
12 process question, trying to perhaps give us and give
13 the Board some light as to how to draw that line as to
14 when you have gone far enough in the analysis in terms
15 of the quantification side that further quantification
16 really is not going to be fruitful.

17 A. I think what you have said is quite
18 reasonable.

19 Q. Now, in terms of the quantification
20 of non-timber values, I gather that you are of the view
21 that we should attempt to be as quantitative and
22 precise as is possible and that we should attempt to
23 improve that over time?

24 A. That is fair to say.

25 Q. Now, given that or perhaps I will ask

1 you this. Is it your view that there has been an
2 extraordinary amount of effort expended in Ontario to
3 quantify and estimate non-timber values in
4 socio-economic terms particularly dealing with forest
5 activities and values or ecological services?

6 A. I am not sure if I got the question
7 the right way around. Let me say that I am not aware
8 of a great deal of effort directed at estimating the
9 willingness to pay for non-timber values in northern
10 Ontario.

11 Q. Would that be, in your view, one
12 reason why it is more difficult to quantify those
13 values as opposed to the timber side where such
14 information is more readily available?

15 A. Again, I am not quite sure I
16 understood your question. I think that we do not have
17 information on willingness to pay for these values
18 because the research has not been undertaken to try to
19 establish it.

20 Q. And so my question was, simply, is
21 that one of the primary reasons in your view that they
22 are difficult to quantify at the present time?

23 A. Well, forgive me. I think it seems
24 to me that your question is asking two different
25 things. One is why are these benefits difficult to

1 quantify and the other is why do we not have
2 information right now about what the benefits are.

3 Q. I asked you about the benefit side if
4 we had information, I was now asking you if one of the
5 reasons they are difficult to quantify is simply the
6 matter that we have not attempted to collect that
7 information?

8 A. Well, I am not sure that this is
9 helpful. The reason that non-timber benefits are
10 difficult to quantify is first of all that they are not
11 sold through markets.

12 And secondly, that when you try to
13 ascertain them through other methods, you are dealing
14 with newly developed survey technology and we are faced
15 with questions about whether or not the answers people
16 give to surveys really measure what they truly would
17 pay. And we are faced with the fact that people's
18 answers probably depend on the way in which the
19 questions are framed.

20 So those are the reasons why it is
21 difficult to quantify things. It is my position that
22 despite these difficulties, it is certainly worthwhile
23 to attempt to quantify them and the reason that I have
24 not been able to trot in to the Board here and say,
25 well, the value of an incremental 40-million hectares

1 of wilderness is \$500,000 is because of this kind of
2 analysis has not been completed.

3 Q. Is it reasonable in your view to
4 expect the precision and ease with making those
5 estimates will improve over time if that type of
6 information is collected and used?

7 A. I am not sure what you mean by that
8 type of information.

9 Q. The type of willingness to pay
10 information that you have referred to needed to
11 estimate non-timber values, non-marketed values?

12 A. I think that making good decisions
13 about forest management would be easier if we
14 systematically attempted to collect willingness to pay
15 information.

16 Q. An argument that has been brought
17 forward on occasion with respect to this particular
18 issue is that because of the high level of uncertainty
19 that some people suggest is associated with these
20 values, that you are no better off quantifying than
21 simply saying it is bigger or smaller, would you agree
22 with that view, or do you feel that it is better even
23 with a large margin of error to quantify the result?

24 A. Well, I guess fundamentally the
25 question is whether our decisions would be changed by

1 acquiring additional information. And quantifying
2 willingness to pay can be done either directly by the
3 kinds of survey techniques we seem to be talking about
4 or indirectly by identifying the costs and easily
5 measured net present value of achieving the goal and
6 then asking whether we would be willing to pay them.

7 Suppose that we had scientific evidence
8 to indicate that a certain practice was going to
9 destroy all life in the forest that has been cut over
10 and suppose we had a gut feeling that the circumstances
11 were such that nobody would ever wish to wipe out all
12 life in northern Ontario forests, why then it does not
13 seem to me to be worthwhile trying to quantify that
14 particular willingness to pay much farther.

15 But with that proviso, it does seem to me
16 in general appropriate to try to refine our estimates
17 as much as possible and I think just knowing the order
18 of magnitude of willingness to pay for certain items is
19 valuable information.

20 Q. On page 125 of your witness
21 statement, Section 5.1.4 you make reference to the
22 informational costs or potential informational costs of
23 a sophisticated cost benefit analysis and we have heard
24 evidence from Mr. Hynard in particular about the
25 difficulties that applying this approach on an

1 operational level might imply.

2 And I wanted to ask you, would you agree
3 with the proposition that there may be a front end cost
4 to implementing cost benefit analysis as a routine part
5 of timber management plans in terms of both information
6 and administrative changes, but that once that front
7 end cost is borne, the overall process will be
8 streamlined and much less demanding?

9 A. I certainly hope so.

10 Q. Has that been your experience?

11 A. Since I am not -- I have never been
12 in an organization which has implemented cost benefit
13 analysis as a routine procedure so my experience is not
14 applicable.

15 Q. Now, in terms of generic information
16 that might be collected at a Provincial or regional
17 level, is it your experience as an economist that that
18 regional type or generic information can be used for
19 analysis that, for example, at forest management unit
20 level rather than having to conduct a willingness to
21 pay survey for each timber management plan in each
22 forest management unit?

23 A. I believe that there will be many
24 cases in which generic information will be applicable
25 to the forest management unit. And I do not think that

1 it will be appropriate in every case to conduct
2 willingness to pay surveys routinely for individual
3 forest management units. It might be when those seem
4 to be particularly unique natural resource
5 environmental services that can be provided in that
6 area.

7 Q. Now, you made reference in your
8 testimony when you were speaking with respect to the
9 Treasury Board guidelines that you were of a view that
10 the members of the public service were quite committed
11 and hard working people. My client does not dispute
12 that.

13 But at the same time my client has a
14 concern that the professionals responsible with
15 undertaking this type of analysis have a minimum level
16 of competence. Would you agree that there has to be
17 some level of socio-economic training, some minimum
18 level of socio-economic training in order to implement
19 this type of approach?

20 A. I think that everybody involved in
21 the operational development of cost benefit analysis
22 should certainly have a minimum degree of training.
23 And I think that the level of economic training
24 required will increased the higher up in the hierarchy
25 you go so that the people responsible at the provincial

1 level for organizing this kind of thing I would hope
2 would have had -- would have a really good command over
3 the theoretical basis for cost benefit analysis and be
4 highly trained.

5 I do not think that the people in the
6 individual forest management unit would need an
7 impossibly high level of training. It might be
8 sufficient to make sure that you know, you are familiar
9 with the concepts of discounting, you are familiar with
10 the concepts of market failure, you know on the basis
11 of a single university course what the goals of cost
12 benefit analysis are and how it is carried out in some
13 situations.

14 MADAM CHAIR: Do you see then, Dr.
15 Muller, if MNR were to undertake some systematic cost
16 benefit analysis for its management units, that that
17 would be done by a head office, staff who would
18 organize it and people at the management units would
19 essentially be outside of it?

20 DR. MULLER: Well now, I am not an expert
21 in public administrations so my understanding would be
22 that you would centrally develop a method of trying to
23 develop this first cut and then you would ask your unit
24 people, the people responsible for the forest
25 management unit to follow this method.

1 And you would use information provided by
2 them and you would hope that they would understand what
3 it was that they were trying to achieve, and to do it
4 intelligently and then somebody with further training
5 and expertise at the central level would review the
6 results and try to make sure that they were done
7 consistently with the underlying theory and look for
8 ways in which they could be improved.

9 I would not want to say that I am ruling
10 out the -- I mean, I would think that it would require
11 the full cooperation of the local people but that it
12 would also require somebody with some greater
13 background in cost benefit analysis or public finance
14 at the central level.

15 MR. HANNA: Q. Dr. Muller, have you read
16 the OFAH terms and conditions carefully?

17 DR. MULLER: A. No, I have not.

18 Q. Have you ever read them?

19 A. I have been presented with a binder a
20 few minutes ago which has them in them. I have begun
21 to glance at Section 2.

22 Q. Dr. Morrison?

23 DR. MORRISON: A. I have briefly just a
24 few minutes ago read sections of it but I certainly
25 have not read it in its entirety nor have I studied it.

1 Q. Dr. Muller, could you turn to page 9
2 of the OFAH terms and conditions, Exhibit 1637, and I
3 would like you to look specifically at term and
4 condition 40.

5 A. Yes, sir.

6 Q. Subsubsection IV. And after you have
7 had a chance to study that, would you please indicate.

8 Perhaps I am sorry to interrupt your
9 thinking there, you might notice on the opposite side
10 of the page you will find rationale associated with the
11 term and condition which will provide explanation for
12 the reasons for the specific term and condition. You
13 should review that also.

14 MADAM CHAIR: Mr. Hanna, was that page
15 40?

16 MR. HANNA: Term and condition 40, page
17 9, Madam Chair.

18 MADAM CHAIR: Thank you.

19 DR. MULLER: Mr. Hanna, would you be a
20 little bit clearer what is meant by socio-economics in
21 this term and condition?

22 MR. HANNA: Q. That was going to be one
23 of my questions to you, Dr. Muller. It is easy to
24 define, for example, a forester because I can say one
25 must be an RPF. Similarly we have used in terms of the

1 biologist categories certified positions that are
2 available to biologists for each of those categories.
3 Is there a similar certification-type procedure that
4 would specify a minimum level of training in terms of
5 socio-economics to the best of your knowledge?

6 DR. MULLER: A. Well, Mr. Hanna, I have
7 a couple of problems with the term or the condition
8 number 40. One of the problems I have is I am not
9 aware of any recognized university discipline certainly
10 at my university called socio-economics. There is a
11 generally recognized discipline of economics.

12 There is a generally recognized
13 discipline of sociology. There is a discipline of
14 geography. And it is not clear to me then what the
15 content of the statement of subsection 4 of the term or
16 of the condition really means. Perhaps I should leave
17 it there.

18 Q. Well, you still have not answered my
19 question, however. My question was, do you know of a
20 similar type of professional certification that is
21 available in Ontario, that would establish a minimum
22 level of qualifications that you feel would be
23 appropriate in terms of let us just leave economics as
24 being the sole field we deal with.

25 DR. MORRISON: A. Just if I can

1 interject here. Isn't there an important question
2 about for what purpose? For what purpose does this
3 person need these qualifications, of what are they
4 being expected.

5 Q. I believe that is referred to in the
6 rationale but I will just explain that briefly to you.
7 The purpose at least from my client's point of view is
8 that they wish some assurance that those members of the
9 government or the industry that are putting together
10 timber management plans have a minimum level of
11 qualification.

12 We have, for example, at this hearing
13 heard that fish and wildlife supervisors are registered
14 foresters, registered professional foresters with one
15 undergraduate degree in wildlife biology and no
16 biologists working for them. And it is that type of
17 concern that this term and condition has attempted to
18 address.

19 DR. MULLER: A. Well, the shortest
20 answer to your question is no, I am not aware of any
21 professional organization of economists which certifies
22 economists as having competence in this way.

23 Q. Okay. Now, my question to you is if
24 we leave out the prefix "socio" and simply talk about
25 economics, would that be a reasonable means to define a

1. level of understanding appropriate to implement this
2 type of approach at a forest management unit level?

3 A. Well, that brings me to one of my
4 other problems with the condition. And it is a matter
5 of personal judgment I guess rather than my expertise
6 as an economist. I feel that the condition has a
7 desirable goal but it smacks of credentialism and there
8 are a lot -- I believe there is a lot of intelligent
9 people out there without forestry training who -- let
10 me put it this way.

11 There are probably intelligent, competent
12 people out there who are not professional foresters who
13 would do a fine job in talking about forest growth and
14 timber harvest and there are probably people out there
15 who are not university graduates in economics who would
16 do a fine job of applying the principles that are
17 necessary in economic analysis.

18 I kind of back this up with some ad hoc
19 economic theorizing, but my basic feeling is that while
20 it is desirable for people to have demonstrated
21 competence in a field such as this, it is a bit of a
22 mistake to say that only people with a specific
23 certificate are capable of doing a job and nobody else
24 is. I am worried about that.

25 Q. Have you an alternate proposal to

1 provide assurance to the public that a minimum level of
2 competence, whether it's credentialism or otherwise, is
3 provided in the preparation of timber management plans
4 and if so, could you indicate to me where it is in the
5 FFT terms and conditions?

6 A. Well, Mr. Hanna, I do not believe
7 either Dr. Morrison nor I addressed the issue of
8 composition of timber management plans. I have
9 planning experts for developing timber management plans
10 and consequently I do not think either of us developed
11 a position on who should be on them.

12 Q. What I am trying get at with you, Dr.
13 Muller; and the reason I am asking you is you are an
14 economist, you have brought forward economic evidence,
15 you are suggesting that this is an approach that could
16 be used in a timber management plan. I am asking what
17 level of competence and how that should be specified in
18 the appropriate way in the Board's decision if they so
19 saw fit?

20 A. Well, without wanting to get hung up
21 on this, Mr. Hanna, I think the qualification ought to
22 be that the person is a hard-working, intelligent
23 person who has demonstrated ability in a wide range of
24 assignments, who enjoys the confidence of his superiors
25 and who has had at least one university course or

1 equivalent exposure to the concepts of cost benefit
2 analysis.

3 MR. HANNA: Madam Chair, I hope to be no
4 more than maybe two hours tomorrow morning and I should
5 be finished.

6 MR. MARTEL: Could I get a clarification
7 from you?

8 Why does just one individual out of all
9 of them have to have three years experience?

10 MR. HANNA: Well, actually I think, Mr.
11 Martel, if you look to be an RPF, I am sure one of them
12 will correct me, we do not have many in the room today,
13 it is unusual, but I noticed -- I did say there was
14 not, but there were not as many, is there is a minimum
15 residence time associated with getting your RPF.

16 I know there is in terms of both the
17 wildlife biologists, fishery biologists similar type of
18 residence time and so it was simply just reflecting
19 that it is already captured in the other qualification,
20 Mr. Martel.

21 MS. SWENARCHUK: As of May 10th of this
22 year, you may qualify as well, Mr. Martel. You will
23 have three years.

24 MR. MARTEL: Is that right? Thanks but
25 no thanks.

1 MADAM CHAIR: We will see you tomorrow
2 morning at nine o'clock.

3
4 ---Whereupon the hearing was adjourned at 4:00 p.m., to
5 reconvene on Thursday, February 7, 1991 at 9:00 a.m.

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